Madurai Kamaraj University

(University with potential for Excellence)

Distance Education

M.B.A

Second year

IV Semester

Elective IV Production

TOTAL QUALITY MANAGEMENT

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TOTAL QUALITY MANAGEMENT

MADURAI KAMARAJ UNIVERSITY

MADURAI - 625 021.

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SYLLABUS

TOTAL QUALITY MANAGEMENT

I. OBECTIVES

This course deals with the quality – Productivity challenge. Management of Quality and the Production system.

It deliberates the importance of Quality function in the revised global scenario.

II. SYLLABUS

Introduction to Total Quality Management – Concept of TQM – Quality and Business Performance – Service Quality vs Product Quality – Altitude and involvement of Top management – Communication – Culture – management systems.

Information Analysis and Information Technology- Strategic quality planning – human Resources Development and management.

Management of Process Quality – history of Quality of Control – Product Inspection vs Process control – Statistical quality control – problem analysis – pare to analysis – human side of process control.

Customer focus and satisfaction – a Quality focus – getting employee involvement Measure of customer satisfaction – service quality customer retention – profitability – Bench marking – essence of Bench marking – Benefits of Strategic Bench marking process – Pitfalls in bench marking.

Organising for TQM – Systems Approach – The people dimension – Small groups and employment teams for TOM – Measuring productivity – white Collar Productivity – Activity analysis – Reengineering – The costs of Quality –Activity based Costing.

ISO 9000 – Universal standards of quality – ISO around the world – Benefits of ISO certification – Process of getting ISO certification – cost of certification – Implementation.

Suggested Readings

1. Beyond Total Quality Management (TMH)

   Geg Bounds, Lyle Yorks, Meladams, G. Ranney

2. The Quality Imperative (TMH) – A Business week Guide
3. Global Management of Quality Assurance System (TMH)

4. Quality Planning and Analysis (TMH)

   J[illegible]n, Gryna

5. Juran on Leadership for Quality – An Executive Hand Book (Free Press) J.M. Juran

6. Quality for Progress and Development (Weily Eastern)

   P.K. Bose, S.P. Mukherjee, K.G. Ramamurthy

7. Total Quality Management – Text, Cases and readings

   Joel E.Rose (Deep & Deep Publication)

INTRODUCTION TO TOTAL QUALITY MANAGEMENT

UNIT STRUCTURE

1.1 Introduction
1.2 Need for TQM
1.3 Definitions
1.4 Attitude
1.5 Quality Control Approach
1.6 Quality circles
1.7 Customer focus and satisfaction
1.8 customer retention
1.9 Answers to Check Your Progress
1.10 Review Questions

UNIT OBJECTIVES

1. To Understand the various types of TQM
2. To learn the Advanced Approaches of TQM
3. To learn the customer focus and satisfaction,

1.1 INTRODUCTION TO TOTAL QUALITY MANAGEMENT

QUALITY IN THE PAST AND PRESENT

In most of the organizations, the word "Quality" is confined to the Quality Control Department. The Quality Control Department in-turn becomes the custodian of Quality of Product. The Activities of Quality Control Department are restricted to in-house verification inspection and rewords/rejects ,etc and thus the improvement of Quality of Centering the Quality control Department alone.

Moreover, customer satisfaction was meant to attend customer complaints and claims during warranty period. The other departments especially Production. Maintenance and Service Departments do not consider the Qual-

ity as their direct concern. The top Management also believed that the Promotion of Quality is a specialized activity in their organization.

This was the history of Quality awareness for the past so many decades. The organizations were also not facing heavy competition so as to think Quality as a serious mater. But the emerging global economic environment has changed the entire scenario.

For Survival, meeting the challenges and continued success of Business, any organization is forced to re-consider the definition of Quality". The market trend, hectic competition and customer awareness have evolved the quality to a new height and importance. Quality is no longer regarded as a sect oral objective.

The Focus of Quality is not confined to merely to product. Manufacture and in-house quality control. Quality has become as an essential attribute and approach for the stabile: continuity and growth of an organization and as well as the society. Promoting Quality in all functions of an organization is the need-based change required to face the changing situation.

1.2 NEED FOR TQM

In the emerging environment the top management. Professionals and experts have raised their toe to reap the benefit of Total Quality Management (TQM).

But the implementation of TQM is not a nightmare or magic. It is a time consuming and total involvement process. The Top Management has to face many problems in the process of transformation. The Global action in the organization in the implementation varies between the present and past practices. Objectives and goals are to be established for each function and communicated down-to-line for achieving customer satisfaction. Promoting polices for the purpose of the organization gets greater importance. Top management's involvement and commitment is inevitable in the transformation of policies, objectives and quality management.

1.3 DEFINITION OF TOTAL QUALITY MANAGEMENT / CONCEPT OF TQM:

Management approach of an organization centered on Quality based on the participation of all its members and aiming at long term success through

customer satisfaction and benefits to all members of the organization and to society(Ref: ISO 8402: 1994)

Total Quality Management (TQM) is the combination of all function and processes within an organization for achieving continuous improvement of Quality of Products and / or services. The ultimate goal is to enhance customer satiation. Off all the management issues faced in the last few decades. none had the impact few decades. None had the impact or caused so much concern as quality in the products and services. A report by the Conference of Industries indicates that senior executives agree that the banner of the total quality is essential to ensure competitiveness in global markets. Quality experts J.M. Juran calls quality as an inevitable phenomenon in this age. This concern for quality is not misplaced.

1.3.1 QUALITY AND BUSINESS PREFORMANCE

The interest in quality is due to foreign completion and the trade defy. Analysts estimate that the vast majority of organizations will continue to face strong completion from the East Asian countries and the European Economic Community. This comes in the face of a serious capability to compete in the global markets. The Problem has not gone unnoticed by government officials. corporate executives. and the public at large. The concern of business executives is reflected in their perceptions of quality.

TQM is based on a number of ideas. It means thinking about quality in terms of all functions of the enterprise and is a start-to-finish process that integrates functions at all leavels. It is a systems approach that considers every interaction between the various elements of the

It is paradoxical that there is more concern for product quality than for quality of services. Consider also that up to half of employment in manufacturing is in such staff or white-collar jobs as marketing. finance or the many other activities not directly involved in physically producing products. If it is accepted that quality improvement can only be achieved through the actions of the people. the conclusion emerges that possibly 90 percent of more of the potential for improvement lies in service industries and service jobs in manufacturing firms. The concept of "White collar quality" is becoming increasing recognized as the service sector grows.

Despite this obvious need for this quality service. people directly employed in manufacturing functions tend to focus on production first & quality second. "Get out the production" and "meet the schedule" are common cries

on many shop floors. A study conducted revealed the supervisors believed that a deep concern of quality was lacking among workers and that quality as an objective in manufacturing was secondary to the primary goal of meeting production schedules. This same conclusion is suggested in the experiences of 100 over companies. Supervisors almost invariably set targets related to productivity and cost reduction rather than quality improvement.

The seeming manufacturing-service paradox suggests that the emphasis on services should be substantially increased. The first of these considerations is the "bottom line" factor. Studies have shown that companies rated highly by their customers in terms of service can charge close to 10 percent more than those rated poorly. People will go out of their way and pay more for good service, which indicates the importance placed on service by customers. Conference Board reports concluded that the strongest complaints of customers were registered not for products but for services. Recognizing this, executives rate quality of service as a more critical issue than quality of product. Tom peters; co-author of Search for Excellence. scolds manufactures for allowing quality to deteriorate into a mindless effort and suggests that the best approach is to learn from leading service companies.

As a strategic issue, customer service can be considered as a major dimension of competitiveness. In the most exhaustive study in its history, the American Management Association surveyed over 3000 international respondents; 78 percent identified improving quality and service to customers as the key to competitive success, and 92 percent indicated that providing superior service is one of their key responsibilities, regardless of position. To say that your competitive edge is price is to admit that your products and services are commodities.

After being viewed as a manufacturing problem for the most of the past decade, quality has become a service issue as well. TQM relates not only to the product, but to all the services that accompany it as well. In many ways defining and controlling quality of service is more difficult than quality assurance products. Unlike manufacturing, service industries share unique characteristics that make the process of quality control less manageable but no less important. Moreover, the level of quality expected is less predictable.

Service company operations are affected by several characteristics, including the intangible nature of the output and the inability to store the output. Other distinguishing characteristics include:

1. Behavior of the delivery person
2. Image of the Organization
3. The Customer present during the production process and performing the final inspection
4. The measure of output is difficult to define
5. Variance and acceptance ranges may not apply
6. Adjusting the control system if the customer is present

However, the most significant problem with the delivery of services is that it is

Typically measured at the customer interface-the one-on-one, face-to-face interaction between supplier and customer. If a problem exists, it is already too late to fix it.

The Key issues and terminology related to TQM are given below:

1. The cost of quality is the measure of non-equality(not meeting customer requirements) and a measure of how the quality process is progressing
2. A cultural change that appreciates the primary need to meet customer requirements. implements a management philosophy that acknowledges this emphasis. encourages employees involvement and embraces the ethic of continuous improvement.
3. Enabling mechanisms of change. including training and education, communication. recognition, management behavior. teamwork and customer satisfaction programs
4. Implementing TQM by defining the mission, identifying the output, identifying the customers, negotiating customer requirements, developing a "supplier satisfaction" that details customer objectives and determining the activities required to fulfill those objectives.
5. Management behavior that includes acting as role models. use of quality processes and tools, encouraging communication, sponsoring feedback activities, and fostering and provide a supporting environment.

Check your Progress

1. What is the need for TQM?

1.4 ATTITUDE AND INVOLVEMENT

Unlike in the earlier decades. the chief executive officers and apex executives have to take the leading role to promote company-wide TQM. Qual-

NOTES

ity is to be re-defined in a much broader perspective than mere product quality so that the goals of the organization are more effectively realized.

While on the one side, the threat and loss to profit triggered many companies to TQM implementation; many positively motivated managements have launched TQM processes on their own to enhance customer satisfaction, improve share and returns, and a acquire leadership in the market. These managements searched for practical themes to rouse company-wide interest and consciousness in moving towards their goals.

The top management has a to design and implement motivational programmes by calculated employee-customer linkages at various levels in the organizational hierarchy. It is very important to communicate the TQM policy and policy intentions to every one in the organization. Every occasion should be utilized to demonstrate to the employee how his or her activity affects or promotes customer interests. In-company surveys have repeatedly brought out distressing gaps in the understanding of the customer needs both in the vertical and the horizontal layers of the organization.

AN APPROACH BY TOP MANAGEMENT

The top management can approach in the following manner to adopt TQM concepts:

1. Identify the customer needs, requirements and expectations.
2. Prioritise them - designate these requirements as specific goals with targets, schedules, like committed delivery, quality standards, cost, etc.
3. Start with the key requirements. (Meeting all the requirements is important; concentration on the vital few is critical. Follow up with a smaller number of requirements, say, two to three at a time.)
4. Identify and list the organisation's processes including intra and cross-functional activities that add up to the key requirements.
5. Make a flowchart of the way the business is actually done(not how to do it as per instruction manuals) to comply with the requirements.
6. Using the flowchart as a basis, identify and evaluate the delays, bottlenecks and non-value-added sub-processes (elements of activities) on notional cost-benefit basis.
7. Use a flowchart as a basis for maintaining and expediting the flow up to the goal terminal .This may involve re-locating inspection/control stations, eliminating hurdles by restructuring the organization and

sponsibility schedules, compressing the number of decision processing points, modifying the routes for smoother flows, rationalizing the sequence of processes reducing inventories, etc.

8. Define the measurement points and implement measurements to determine where the greatest attention needs to be given for achieving the objectives.
9. Identify problems / priority areas based on contribution to end-results
10. As the exercise continues, repeat the steps one to nine in respect of all the require- ments and repeat the ten steps over and over again as an approach for continuous improvement.

BASIC QUESTIONNAIRE

As a first step in the approach to TQM, a basic questionnaire is to be prepared as follows:

1. Is the organization structure is defined with departments?
2. Are the policies, targets and goals of the organisation defined?
3. Are the responsibilities and authorities defined?
4. Are the activities defined?
5. Who are the customers?
6. Are the customer's needs and requirements are defined?
7. Are the activities are consistent with the customer expectations?
8. What do the internal/external customers require from the organisation?
9. Are the activities are consistent with their expectations?
10. Who are the suppliers?
11. What do the organization requires from the suppliers?
12. Are the suppliers' activities consistent with organization's requirements?
13. Calibrate the answers with the customers and the suppliers.
14. Re-align the structure, responsibilities, authorities and activities.
15. Repeat the process from 1 to 14 until everything is in order.

1.5 THE QUALITY CONTROL APPROACH:

The TQM concept has two components :

1. Defect free product / service supplied on time to customers

2. Advancing the state-of-the-art : a development process to meet the rising expectations of customers in their hardware and software requirements.A defect free (or non-conforming) product is the classical focus of quality control. Non-conformance broadly covers a wide spectrum of issues like

1. Failures on delivery with respect to the committed Quality, time and place;
2. Non-compliance of time-schedules in commissioning and supply of parts;
3. Delays in servicing and
4. Gaps in communications to customers on the application and use of product, rendering it to unusable, unreliable, breakdown-prone, etc.

This aspect falls within the familiar domain of quality. Improvement approaches are issue-based, customer-driven and result oriented. The approach is not always tool or technique requiring proportional expertise. It is, however, important to have a feel of the concept and approach to track the nature of system-deficiencies, which commonly dominate the prevention of defect or non-conformance. Managerial exposure to the approach and familiarity with the nature and application of the concepts are far more important both in the daily management and long term policy control for the defect prevention non-conformance.

1.5.1 ADVANCED APPROACHES

Some of the simple approaches widely used in TQM concepts are as follows :

1. ABC analysis (Pareto principle) to separate the crucial few for special attention.
2. Cause-effect analysis (Ishikawa / fish-bone approach).

   Technical and work standards checklist aimed at prevention of non-conformance of the process / product.
3. Upstream control to prevent defects at source: the design stage, process engineering, R & D, etc. to eliminate downstream non-conformance.
4. Statistical Process Control (SPC) for defect prevention including simple operational, step-by-step guidelines for machine / process settings and on-line monitoring.
5. Rationalizing on-line check-schedules to aid timely detection or preven-

tion of nonconformance, thus avoiding uneconomical value-additions, high work-in-progress and blockade in the production flow.

6. Project management approaches such as monitoring of network and critical sub- moutes by using business process of functional or depart-mental activities.
7. Analyses of flowcharts to achieve effectiveness in meeting time sched-ules for de-livery and commissioning, etc.
8. Motivational devices such as Quality Circles (Small Group Improve-ments).
9. Policy deployment measures by goal or sub-divided goals / targets inked to customer results.

1.5.2 UPGRADATION APPROACH

1.5.2.1 TECHNOLOGY UPGRADATION

The main component of TQM concept seeks to focus upgrading the technology and product / software (service) development. It essentially involves a step by step approach to move towards this concept. Customer expectations and needs are continually raising. As customers are the main streams of the business. the reponse has to be flexible to meet their expectations. Marketing has the first job. of understanding and expressing, the requirements in full. This continues as a process through development. design, production, sales and service. Quality by design is a powerful concept covering ease of use, designing for right technology, manufacturability and reliability. It is well known that rugged design and technology developed by investment on quality during the development stage will pay back the bottom-line investment several times besides achieving lasting customer satisfaction. A combination of design and quality tools with help find design problem even before any physical models is built. R & D management, marketing and design are vital factors in the real achievements of TQM as they significantly contribute to upstream optimiza-tion and downstream control. Quality, productivity and optimization concepts as well as basic engineering ideas are essential inputs.

Striving to develop products and services as a continuous exercise is an essential ingredient for a competitive and for achieving the important goals of customer satisfaction and necessary to transform them into TQM profession-als.

1.5.2.2 EDUCATION AND TRAINING

It is essential to improve education and training of each employee including top management. To the upper and senior management, it should be more on concepts, and to the operational supervision, more on tools and applications. Topics of special relevance to the staff, specialists and necessary to transform them into TQM professionals.

1.5.2.3 POLICY PROMOTIONS

High-tech, high-comfort mode companies turned to TQM for rejuvenation after having suffered setback against competing processes. Led bye top management, TQM focused on customers has strengthened the competitive processes. The approach and the style of operation have become more participative. Quality-circle and small-group activities have enhanced the capability and consciousness of employees towards customer-driven improvements.

Policies that on the one hand, strive at more compliance with warranty obligations towards customers, and on the other, operate on penalty provisions for non-conformances from outside supplies, have a restrictive impact on the corporative objective. TQM promotes a positive attitude by adopting an approach similar to the in-house, to cultivate suppliers and customers and stay close to them for total benefit. The importance of issue based feedback and feed forward measures is emphasized in the extended in the improvement exercises.

Winning nation awards for excellence in performance and meeting all round regulatory safety and health requirements without facing penalty/liability from the society at large, striving for international code recognitions and federal contractual obligations have provided convenient themes. Compelling the employees to increase profit, cut cost, improve quality and raise productivity have not always had an equivalent impact.

In the changed perspective, calls and appeals by professionals for commitment to quality by management have become obsolete. In some respects, seeking commitment amounts to bagging the issues as TQM is concerned with issues so central to survival and successful business. Commitment to TQM has become an essential attribute of good management.

1.5.2.4 SMALL GROUP IMPROVEMENTS:

Small group activities have received widespread attention since the very beginning. Economies torn by world war-II adopted this approach for reconstruction on a large scale. Motivated by the instinct for self-preservation for

themselves and their peoples and small groups have solved many problems related to customers and marketing in companies

Problems have varied in nature from engineering to production to basic R & D break-through. Specialist teams of engineers and managers have provided much needed inputs in terms of expertise, facilities and guidance in such expertise.

Quality circles is not a tool of TQM. Top management does not constitute and put quality circles to work. Quality improvement Teams (QITs) are the kind of management devices that work towards specific TQM objectives.

A quality circle is small voluntary group of workers with a foreman and supervisors as its center to work on improvement. Top management welcome and nurse the circles, aid and motivate them by imparting training and enhancing the capability of circle members, their leaders and facilitators. Quality circles are a valuable resource to the company. The work of quality circles corresponds to a phenomenon or postwar small group activities. They have been popular devices for enhancement of morale and employee consciousness. Companies have focused on enhancing the capability of this work-force for creating a lively work place and for working towards improvement. Extensive literature is available on the effective uses, abuses and misuses of quality circles in deserve settings. Money saved is not important. What is important is how the circles enhance and sustain quality-consciousness in a company.

Check your Progress

2. What are the basic approaches for a quality control?

1.6 IMPORTANCE OF QUALITY CIRCLES

The success of Quality circles depends upon the activities and tasks of managerial origin. Clarifying the role of quality circles would be of great assistance to success.

Supportive action to promote the positive role of quality circles includes

1. Formulating practical guidelines.
2. Providing assistance.
3. Setting up secretariat.
4. Defining the position of the quality circle in the company.
5. Specifying the objectives of the circles.
6. Providing education to supervisors, circle members and leaders.
7. Specifying guidelines for the selection of circle leaders.
8. Providing guidelines for meetings and presentations.
9. Promoting themes.

10. Implementing the accepted suggestions.
11. Setting evaluation criteria.
12. Extending recognition.

Since one of the key objectives is to enchance the capability and quality consciousness of the work force, it would be advisable to promote human-interest themes, working towards TQM improvement process.

1.7 FOCUS ON CUSTOMER

Customers are the mainstream of business. Keeping them satisfied and happy is a crucial objective. Despite this enough importance has not yet been accorded to implement customer-driven improvements in companies.

To understand correctly the kinds or products and requirements that the customers want and feed them back for effective use to each of the company's functions that is a basic step. Sales, distribution and service are the frontline contacts with customers. They play a vital role.

The company with its network of processes and activities is a complex circuit. Feedback from customers often suffers distortions. Based on feedback, the products made have to become distortion free.

The feedback itself is a continuous process. It helps to build and sustain the image of the company. It aims at total conformance to requirements of customers. Staying close to customers is important not only during the warranty but in the post-warranty period as well. This helps to improve zero non-conformance more effectively. and provide a basis for long-term technology and product development.

1.7.1 CUSTOMER FOCUS AND SATISFACTION

The widespread tendency to ignore complaints or track them and identify the cause(s) can have very serious consequences. This is particularly true in services, where it is estimated that for every complaint a business receives, there are 26 other customers who feel the same way but do not air their feeling to the company.

Failure to identify the root cause of complaints means that reduction of variation in the causative process is more difficult. A customer unable to get through to a sales representative is evidence of a malfunction in the telephone procedures (process) or the sales and marketing function. Thus, it becomes necessary to tie the customer to the process.

Evidence indicates that part of the cause of this failure to close the

customer process loop is inadequate support from top management for the total quality management (TQM) infrastructure and a continued focus on the techniques of TQM, particularly statistical process control (SPC). Another reason for the lack of customer focus is the tendency of many firms to emphasize the techniques of TQM such as SPC and other outcome-oriented methods such as productivity and cost reduction. Again, these are desirable and necessary, but a singular emphasis on these areas is to put the cart before the horse. The customer is not really interested in the sophistication of a company's process control,is training program, or its culture. The bottom line for the customer is whether he or she obtains the desired product. This truism is recognized by Deming, Juran, and Crosby.

1.7.2 PROCESS Vs CUSTOMER :

Customer complaints are analogous to process variation. Both are undesirable and must be addressed. In both cases, the optimum output must be compared against an objective, a standard, or a benchmark. Both are integral parts of the quality improvement process. The integration of the customer and the process is shown conceptually in figure 7-1

From the company's point of view, customer satisfaction is the result of a three-part system:

1) company processes (operations)
2) company employees who deliver the product, and service that is consistent with
3) Customer expectations. Thus, the effectiveness of the three-part system is a function of how well these three factors are integrated.

1.8 CUSTOMER RETENTION:

Customer defection is a problem and customer retention an opportunity in both manufacturing and service firms. Manufacturers have generally been good about measuring satisfaction with products, but now they are moving into service areas. The publicity surrounding the Baldrige Award accounts for much of this. Other reasons related to the size and growth of service Indus-tries and the growing importance of service as a means of strategically competing in the market-place.

Because so many services are intangible, the interaction between employees and customers is critical. Chase Manhattan Bank realizes that an employee's ability to meet or exceed customer expectations when conducting a routine transaction influence the customer's satisfaction with the organiza-

tion. In fact, this interaction satisfaction more than the actual product orservice obtained. The one-on-one or face-to-face contact between the customer and the delivererof the service (nurse, flight attendant, retail clerk, restaurant server) is extremely important.

Manufacturers are careful to measure material yield, waste scrap, re-work, returns, and their consist of poor quality processes. Service companies also have these costs, which are remarket in the cost of customers who will not come back because of poor services. These are customer defections and they have a substantial impact on cost and profits. Indeed, it is estimated that customer defections can have a greater impact than economies of scale, market share or market cost. Despite this, many companies fail to measure defections. determine the cause of defections and improve the process to reduce defections.

1.8.1 CUSTOMER RETENTION AND PROFITABILITY:

What is the ultimate desired outcome of customer focus and satisfaction? Is it achieving product in the private sector or productivity in the public or non-profit sectors? The answer must be An costs enough. however, an accurate cause-and-effect relationship has yet to be established between profit and customer satisfaction. This is due. in part. to the difficulty of measuring satisfaction and meaning of profit. However, there is a proven relationship between customer retention and profit.

> *Check your Progress*
> 3. What do you mean by quality circle?
> 4. What are the steps in the development of quality circles?
> 5. Why TQM should be initiated by the top level management

1.8.2 EXIS ON SUPPLIERS

Zero non-conformances in suppliers is as important as in-house improvements aimed at another performance.

Classical approaches to supply control seem to suffer from inherent weaknesses. It does not do good to enforce and error-free policy or apply pressures for unhampered supplies. Supplier surveys show that aim at such an outcome is not likely to assure durable results.

Seeking non-conformance in suppliers through penalties or incentives is more of a negative exercise. Penalties usually include withholding of payments, demanding compensations, threats to cancel orders or halt further deliveries. Incentives include graded premium payments for re-deuced defect rates or reduced or terminable inspection at receipt, etc. These are not conducive to positive promotion of the TQM policy implementation for the benefit of both the buyer company and the supplier firm.

The positive approach aims at building up good suppliers as prized assets of the company. This demands a relationship of mutual trust and re-

spect. This attitude is reflected in the long-term approach to buying. When the suppliers are continuous, the implementation of the improvement process in the supplier firm would be the key approach.

One-time or across-the-counter buying is normally restricted to suppliers with a proven track record. The question of TQM policy extensions to such transactions does not normally arise.

1.8.3 MEETING SUPPLIERS

The meeting of suppliers from time to time will arrive at the implementation and follow up agenda together with broad time schedules.

Specific items to be settled at the meeting include the following :

1. To priorities the issues for the improvement exercises.
2. To arrive at a common list of issues for improvement after giving due consideration
3. To formulate specific targets and schedules on each of the issues based on priority. The Targets may be fixed as per customer's needs and requirements
4. To deliberate on the composition of improvement teams at the supplier. firm.
5. To chalk out in clear terms the kind and extent of technical or other facilities from the Management.
6. To work out target-bound and mission-oriented educational and training inputs for the Improvement teams and decide on a specific timetable for implementing the programmers.
7. To decide on the review, prompt feedback and follow-up action for achieving the im Provident targets. Such review feedback and follow up by management and other groups have to Be settled at the meeting.
8. To decide on the format of progress report and their periodicity and evaluation and th Persons who will prepare them: and
9. To set up a joint improvement implementation monitoring group.

Answers to Check your progress Questions

1. In most of the organizations, the word "Quality" is confined to the Quality Control Department. The Quality Control Department in-turn becomes the custodian of Quality of Product. The Activities of Quality Control Department are restricted to in-house verification inspection and rewords/rejects ,etc and thus the improvement of Quality of Centering the Quality control Department alone. Hence TQM is essential

2) As a first step in the approach to TQM, a basic questionnaire is to be prepared as follows:

Is the organization structure is defined with departments?

Are the policies, targets and goals of the organisation defined?

Are the responsibilities and authorities defined?

Are the activities defined?

Who are the customers?

Are the customer's needs and requirements are defined?

Are the activities are consistent with the customer expectations?

What do the internal/external customers require from the organisation?

Are the activities are consistent with their expectations?

3) A quality circle is small voluntary group of workers with a foreman and supervisors as its center to work on improvement. Top management welcome and nurse the circles, aid and motivate them by imparting training and enhancing the capability of circle members, their leaders and facilitators. Quality circles are a valuable resource to the company.

4) Formulating practical guidelines. Providing assistance. Setting up secretariat. Defining the position of the quality circle in the company. Specifying the objectives of the circles. Providing education to supervisors, circle members and leaders. Specifying guidelines for the selection of circle leaders. Providing guidelines for meetings and presentations. Promoting themes.

5) The top management has a to design and implement motivational programmes by calculated employee-customer linkages at various levels in the organizational hierarchy. It is very important to communicate the TQM policy and policy intentions to every one in the organization. Every occasion should be utilized to demonstrate to the employee how his or her activity affects or promotes customer interests. In-company surveys have repeatedly brought out distressing gaps in the understanding of the customer needs both in the vertical and the horizontal layers of the organization.

REVIEW QUESTIONS

1. Define Quality
2. Explain the concept of TQM.
3. What is Quality circle.
4. Explain the role of Quality circle.

COMMUNICATION

UNIT STRUCTURE

2.1 Quality culture

2.2 Management Systems

2.3 Information Technology

2.4 Answers to Check Your Progress

2.5 Review Questions

UNIT OBJECTIVES

1. To understand the Communication. Quality culture
2. To learn the Management Systems, Information Technology

Communication is inextricably linked in the quality process. yet some executives find it difficult to tell others about the plan in a way that will be understood. An additional difficulty is filtering. As top management's vision of quality gets filtered down through the ranks, the vision and the plan can lose both clarity and momentum. Thus, top management as well as managers and supervisors at all levels serve as translators and executors of top management's directive. The ability to communicate is a valuable skill at all levels. from front-line supervisor to Chief Executive Officer.

Quality-conscious companies are interested in the cost of poor communication in term of both employee productivity and customer perception of product and service quality. More important than what is written or said is the recipient's perception of the message. Limited or inaccurate facts parceled out to employees may demoralize workers and lead to rumors.

According to Peter Ducker, a true guru of management thought and practice. "The communications gab with in institution and between groups in society has been widening steadily-to a point where it threatens to become and un bridgeable gulf of total misunderstanding. Having said that,he provides an easily understood and simple approach to help communicate the strategy, vision and action plans related to TQM.

Communication is defined as the exchange of information and understanding between two or more persons or groups. Note the emphasis on ex-

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change and understanding. Without understanding between sender and receiver concerning the message. there is no communication. The simple model is as follows.

Sender--------------------------------Message-----------------------Receiver

-------------------------------------Feedback-----------------------

Unless sender gets feedback that receiver understands the message, no communication takes place. Yet most of us send messages with no feed back to indicate that the recipients(or percipient) has understood the message.

Despite the sorry state of communication. Drucker concludes that we do know something about communication in organization and calls it "managerial communication is an extremely complex process. Many Universities provide a doctoral program in the topic. At the risk of oversimplifying both communication theory and Drucker's approach. the essence of his principles can be paraphrased:

One can only communicate in terms of the recipient's language and perception. and there fore the message must be in terms of individual experience and perception. If the employee's perception of quality is "do a better job" or. "keep the customer happy", It is unlikely that the message of TQM will be understood. Measures of quality are needed to ensure agreement on the meaning of the message.

Only the recipient can communicate the communicator cannot. Thus management systems (including training) should be designed from the point of view of the recipient and with the build in mechanism for feedback. Feed back and thus the exchange of information should be based on same measure, target.bench mark, or standard.

All information is encoded, and prior agreement must be reached on the meaning of the code quality must be carefully defined and measures agreed upon.

Communication downward cannot work because it focuses on what we want to say. Communication should be upward.

Employees should be encouraged to set measurable goals.

Larry Apply, chairman emeritus of the American Management Association, has developed company - wide productivity improvement program, Not that the direction communication is upward. Recipient (subordinate) becomes sender, and sender(boss) becomes recipient. The message is specific and mea-

surable. and the subordinate has ownership because he or she originated the message. The appley approach is therefore consistent with Drucker's ideas and sound principles of communication. A modification tailored for a specific firm may be used as a vehicle for TQM implementation.

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These concepts of effective communication can provide a practical approach for communicating about quality in the organization. It only to encode the message(s) in tenns of recipient understanding. The vehicles for communicating about quality are slected components of the TQM system.

1. Training and development for both managers and employees. Managers must understand the process they manage as well as the basic concept of systems optimization. Employee training should focus on the integration and appropriate use fo statistical tools and problem solving methods.
2. Participation at all levels in establishing bench marks and measures of process quality Involvement is both vertical in the hierarchy as well as horizontal by corss-functional teams.
3. Empowerment of employees by delegating authority to make decisions regarding process improvement within individual areas of responsibility, so that the individual "owns" the particular process step.
4. Quality assurance in all organization processes. not only in manufacturing or operations but in business and supporting processes as well. The objectives throughout is continuous improvement.
5. Human resource management systems that facilitate contributors at all levesl(up and down and across) the organizational chart.

Check your Progress

1. What is quality culture?

The digital switching and Customer Service Division of Northern Telecom Canada ltd. Has received awards and international recognition for its quality systems and procedures. Continually communicating the importance of quality to its. 5000 employees is considered vital by division management. Three internal communications specialists generate daily newsletters, monthly newspapers. and videos. One method used by Westing house Electric Corporation to spread the word about quality to its 118,000 employees is an annual symposium. For two days each October, more than 600 employees gather to hear colleagues TQM success stories. The goals for the symposium are the for chairman and senior management to energize employees and to provide attendees an opportunity to talk to each other.

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2.1 QUALITY CULTURE

Culture is the pattern of shared beliefs and values that provides the members of an organization rules of behavior or accepted norms for conducting operations. It is the philospphies ideologies, values, assumption. beliefs, expectations, attitudes, and norms that knit an organization together and are shared by employees.

For example, IBM'S basic beliefs are (1) respect for the individual.(2) best customer service, and (3) pursuit of excellence. In turn, these benefits are operationalised in terms of strategy and customer values. In simpler terms, culture provides a frame work to explain "the way things are done around here."

Other examples of basic beliefs include:

Company	Basic belief
Ford	Quality is job one
Delta	A family feeling
3M	Product innovation
Lincoln Electric	Wages proportionate to productivity
Caterpillar	Strong Dealer support,24 hour spare parts supports around the world
McDonald's	Fast Service, Consistent quality

Institutionalizing strategy requires a culture that supports the strategy. For most organizations a strategy based on TQM requires a significant if not sweeping change in the way people thing. Jack Welch, head of General Electric and one of the most controversial and respected executives in America, states that culture change must be sweeping-not incremental change but "quantum". His culture transformation at GE calls for a "boundary-less" company where internal divisions blur, everyone works as a team, and both suppliers and customers are parters. His cultural concept of change may differ from Juran, who says that,"when it comes to quality, there is no such thing as improvement in general. Any improvement is going to come about project by project and no other way". The acknowledged expers, agree on the need for a cultural or value system transformation.

Deming calls for a transformation of the American management style.

Feigenbatum suggests a pervasive improvement throughout the organization.

According to Crosby. "Quality is the result of a carefully constructed culture. it has to be the fabric of the organization.

It is not surprising that many executives hold the same opinions.In a Gallup organization survey of 615 business executive,43 percent rated a change in corporate culture as an integer part of improving quality. The needed change may be given different names in different companies. Robert Crandall. CEO of American. calls it an innovative environment. while at Dupon it is "The way people think" and at Allied signals "Workers attitudes had to change". Xerox specified a 5-year culture change strategy called leadership through Quality. Tom peters even add what he calls "the dazzle factor".

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Successful organizations have a central core culture around which the rest of the company resolves. It is important for the organization to have a sound basis of core various into whole management and other employees will be drawn. Without this central core, the energy of members of the organization will dissipate as they develop plans. make decisions. communications and carry on operations without fundamental criteria of relevance to guide them. This is particularly true in decisions related to quality. Research has shown that quality means different things different people and levels in the organization. Employees tend to think organizations will have considerable difficulty in improving quality unless core values are embedded in the organization.

Check your Progress

2. How some basic beliefs may impart quality?

Commitment to quality as a core value for planning, organizing.and control will be double difficult when a concern for the practice is lacking. Research has shown that many U.S.supervisors believe that a concern for quality is lacking among workers and managers. Where this is the case. the perceptions of these supervisors may become a self-fulfilling prophecy.

2.1.1 Embedding a culture of Quality:

It is one thing for top management to state a commitment to quality but quite another commitment to be accepted or embedded in the company. The basic vehicle for embedded an organizational culture is a teaching process in which desired behaviors and activities are learned through experiences. symbols. and explicit behavior. Once again. the components of the two quality system provide the vehicles for change. These components as well as other mechanism of cultural change are summarized. Above all. Demonstration of commitment by top manger essential. The commitment is demonstration by behaviors and activities that are exhibited through the company. Categories of behaviors include:

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Cultural	Change	Mechanisms
Focus	From traditional	To quality
Plan	Short-range budgets	Future strategic issues
Organize	Hierarchy-chain of command	

Participation/Government :

Control	Variance reporting	Quality measures and inform functions and processes
Communication	Top down	Top down and bottom up
Decisions	Ad hoc/crisis management	Planned change
Functional	Parochial, competitive	Cross-function, integrative Management
Quality	Fixing/one shot manufacturing	Preventative contious, all functions and processes

Management

Signaling: Making statement or taking actions that support the vision of quality, such as mission statements, creeds, or charters directed toward customer satisfactory, publix supermarkets, "where shopping is a pleasure" and JC Penney The customer is always right" are examples of such statements.

Focus: Every employees must know the mission, his or her part in it, and what has to be done to achieve it. What management pay attention to and how they react to crisis is indicative or this focus. When all functions and systems are aligned and when practice the supports the culture, everyone is more likely to support the vision. Johnson and JOhnsons cool reaction to the Tylenol scare is such as example.

Employee polices, These may be clearest expression of culture, at least from viewpoint of the employee. A culture of quality can be easily demonstrated in such polices as the reward and promotion system, status symbols, and other human resource actions.

Executives at all levels could learn a lesson from David T.Kearns, chairman and chief executive officer of Xerox corporation. IN an article for the academic journal Academy of Management Executive, he describes the changes at Xerox, "At the time leadership-Through-Quality was introduced, I told our employees that customer satisfaction would be our top priority and that it

would change the culture of the company. We redefined quality as meeting the requirements of our customers. It may been the most significant stragey Xerox ever embarked on.

Among the changes brought about by the cultural change were the management style and the role of first-line management. Kearns continues."We altered the role of first-line management from that of the traditional, dictatorial foreman to that of a supervisor functioning primarily as a coach and expediter.

Using the modification of the Ishikawa(fishbone) diagram. Xerox demonstrated how the major componenet of the company's quality system was used for the transiton to TQm.

2.2 MANAGEMENT SYSTEMS:

No matter how comprehensive or lofty a quality strategy may be, it is not complete until it is put into action. It is only rhetoric until it has been implemented. Quality management systems are vehicle for change and should be designed to integrate all areas, not only the quality assurance department. They must be expanded throughout the company to include white-collar activities ranging form market research to shipping and customer service. They are directed towards achievement and commitment to purpose through four universal processes.(1) The specifialization of task responsibilities through structure. (2) the provision of information systems that enable employees to know what they need to do in order to achieve goals. (3) the necessary achievements of results through action plans and projects, and (4) control through the establishment of bench marks standards, and feedback.

Each of these subsystems is the subject of a separate chapter in this book, but the implementation of each can only proceed from a base of clearly established goals. It is the specific task of the management to ensure that these goals are defined. Siseminated, and implemented. Objectives in the areas of quality and productivity must be operational zed by establishing specific sub objectives for each function. Department, or activity, only can courses of action be selected and plains implemented.

The problem, or conversely the opportunity, is to identify those key objectives and activities. That are necessary in order to achieves a given stratey-, in thise case quality. The number of activities and process in the typical organization is so large that a start up quality management program canot address

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all of them in the initial stages. Ultimately, every activity should analyze its out put evaluated in terms of value of both external and internal customers, and quality measures established. Not with standing this longer term need, it is desirable to being by setting goals only for those activates that are critical to achieving the mission statement and strategy

What are these activities and process that are critical to the mission of quality?

The answer lies in identifying the key success factors that must be well managed if the mission of objective is to be achieved, that is the limited number of areas in which results, if satisfactory, will ensure successful competitive performance for the organization. Each activity or process can then be rated as to its importance. Advertising is a key success factor for cocoa-cola but not for MC donnel doggies, design is critical to a hi-tech electronics firm but not to bank.

This process can be used for any major objective, but it is also useful for providing a clear picture of things that must be done to implement a successful TQM program. Identification of key success factors emerges from three dimensions: (1) the dirvers of quality such as cycle time reduction, zero defects, or six sigma: (2) operations that provide opportunities for reducing cost of improving productivity, and (3) the market side of quality, which relates to the salability of good quent programs and the universal process identified earlier. Some U.S managers have adop ideas and language from Japanese companies, many of whom call the process policy deployment.

2.2.1 THE INFRASTRUCTURE:

The integration of vision into the business organization and stratey requires a strong infrastrure, which in business means strong leadership. At each of these three companies senior executives are vested with the responsibility for quality, yet the responsibility for quality is not centralized. Though FedEx and Xerox both have formal quality management department they have kept the departments small to promote the premise that quality is everyone's job futher emphasize that quality is everyone's job, each of the companies encourages employee involvement, by giving the employee authorization to make more day-to-day work decisions and by encouraging them to make suggestions.

To focus the organization around the topic or quality at Xerox, say Maione. "Xerox appointed vice presidents of quality very early in the process

and they participated in the design. The corporate Management Team. in deciding to pursue a quality management initiative, had developed the quality policy and the board outlines of a quality strategy and implementation plan. This group of VPs, called the Quality implementation Team. fine-tuned the board policy, designing Xerox's approach. The infrastructure is minimal: Workers throughout the company are vested with the authority over day-today work decisions.

FedEx management infrastructure is a little more formal, in some cause. Senior managers head cross-functional teams, each of which focuses on one service component in SQI, and are responsible for assuring involvement of frontline employees, support personnel, and other managers on their team.

The senior managers are given the freedom to decide how to implement the quality initiative within their division. West explains, "Our effort has been to give the division the opportunity to "invert it here."We feel that's very important for long term viability of the process; that if the divison the managers and eventually the employees feel the ownership, they are much more likely to treat quality as part of their daily activity".

For the same reason. the quality department is small. "On purpose. we have a very small staff."says west explains,"Our effort has been to give the division to be out on their own and not to have anybody say quality is not working. So it is the quality department's fault.'

Two senior analysts, a quality coordinator and a secretary assist west. who reports to the VP of internal Audit and Quality Assurance (IAQA). who in turn reports to the CEO. One other mnager, currently on special assignment, answers to the VP of IAQA.

IBM's quality staff is also small. "The feeling is that you can't have quality implemented across a company like IBM by decree, 'says Bergevin. "What you really need to do is install the notion of continuous improvement. the thirst for improvement, and the discipline of quality improvement across the entire enterprise the people in the factories and branch officers are making quality happen, not some group of executives at headquarters."

The IBM quality department is headed by a senior VP for MDQ. He answers to the chairman, and his staff consists of about ten to eleven executives. In addition. he rotates another tweleve-relatively senior" managers from all disciplines and geographic areas within the coopeɪation into and out of his quality organization from the field for ten-to twelve - month stint.

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Other senior executives were named as owners, called "funtioncal leaders"hoping tailored sets of goals and strategies that apply to his department or function, the functional leaders, in turn, involve the employees.

With such or organization. work groups in each area of the business naturally form to identify sources of quality problems and ways to improves.

So we have taken a look in a very systematic way all the process that make up the grand total of activity at IBM,"Bergevin adds,"We sort of deconstruct these processes to look for ways that things can be streamlined and improved.

2.2.2 THE IMPLEMENTATION:

With the vision clear and the infrastructure in place, the companies began introducing quality management to the employees. Implementation of the quality initiatives of synonymous with employee training at all three companies. Training included couses in general quality principles, specific quality goals and, in some cause, measurement tools.

The process we focused on at Xerox was to align the supporting mechanisms, and we used training in conjunction with communications as a vehicle to being the deployment, "explains Malone. Using the training program devised by the multi-national quality Training Task Force,a group of senior executives. Xerox began the training implementation. "We started at the senior most leve(CEO) and we cascaded that down the organization using the managers and family groups as a focal point of training. The managers was trained by his or her immediate manager and then that manager, once trained, was responsible fro training his or her immediate direct reports."

Likewise, at IB, a multi national training task force of training professionals designed the training, and the managers handled the training. All employees were deisgned the training in over all quality and company goals, then attended follow-up sessions that pertained more specifically to the individually functions.

Similarly, at FedEx. the implementation strategy was to get key players the executives responsible for a functional group-trained and then in turn have them train others. Says West. "We allowed the divisions and still do today to be pretty much on their own. We said,"We re all going to use the same consultant and the same training package, but then its up to you how you want to do this. Managers could have their employees trained by the consultant, or could have a want to do this. "Managers could have their employees trained

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by the consultant, or could have want to do this. "managers could have their employees trained by the consultant, or could have a selected employee trained as a trainer. The majority of the trainers selected were management selected employee trained as a trainer

2.2.3 SUSTAINING THE EFFORT:

Communication, in all facts, is key to sustain the quality initiative at each of these Baldrige Award-winning companies. Chief among the communication strategies, says Malone, "is getting management to walk like they talk", He explains It is very east to get management to sign up and support quality verbally. It much more difficult to get them to put it into practice and us use the tools day in and day out, and inspect for their use and apply the disciple required.

One of the ways Xerox insures managers implement quality practices is through promotion's Simply put, managers, who support quality are promoted, those the donot are not Malone explains. :What we are really doing is changing the role of the manager from a typical one-to one supervisory style to one where the manager becomes the coach, the counselor, the faciltor". Most of the managers got to where they are by being autocratic. he points out.

"Not everybody is going to be successful in transofring himself form theat old success model to the new success model. You better understand up fron that there are some managers who will probably fall out of the equation who will probably fall out the equation. In our cse we recognized that need and prepared to address it where and when that camp up. by counseling, coaching and in some causes counseling out of the business.

Equally important, says Malone, is two way communication. He advises. No matter how much time you spend designing the process, your probably going to make some adjustments so you want to have an early warning system that says thereis something going away that needs attention. Having two way communication channels working will give you the insights and avenues to understand those things much earlier.

And the one thing you donont want to do is shoot the messenger: if some body brings bed news. You have to be open, willing to listen, to take the good with the bad. Also make sure you knowledge their support and their contribution.

All three agree that simply passing on success stores contributes greatly

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to acceptance and use of the quality management practices.

To facilitate communication, FedEx has one person in the communications group dedicated to the quality process. She helps develop articles that are published in in house publications, and produced video tapes and television segments to be shown on Fed back closed circuit televion network.

Constant feedback provided by the television network includes the closing New York Stock Exchange price of FedEx Stocks, how the overall operations did the previous night and a quality success story.

He explains that approximately each quarter the twelve best quality success stories are chosen the winning terms come to headquarters at the quality departments expenses, to present before top management. The presentations are taped and edited for broadcast.

In addition to the recognition offered in the retelling of success stores. IBM also rewards employees who implement the quality process with luncheons. receptions, and monetary and monetary awards.

Check your Progress

3. Explain the process of communication
4. How information systems aid in communication process?

Also critical, says Bergevin, is translating the customer satisfaction goals to something everyone can instantly understand. We have done some statistical work on the AS/400 category, for example, that shows that every point of customer satisfaction increase that we have been able to measure translates into a revenue effect of 250 million dollars over five years.

Starting Over

Self assessment, along with communication is key to sustain the total quality management initative beyond the achievement of your initial goals, say Malone, West and Bergevin, They add that a total quality management initiative, above all, is a never ending process. It is process of continuous improvement, of continuously questioning the way you do things, and of continuously revaluating the market, customer needs, and work processes. It is process which, done correctly, continuously renews it self.

Their companies, having won the Baldrige Award. continually return to the Baldridge criterial to reevaluate their processes. But whether you use to Baldrige Award Assessment criterial is immaterial, maintains Malone. The issue is evaluating how are we doing versus what we said we were going to do against the desired state. This self assessment, agree executives at Xerox FedEx and IB, makes even baldrige Award winning companies realize that quality is continuous journey.

2.3 INFORMATION TECHNOLOGY

Since quality programs are dependent on good information systems. Chief information officers have the opportunity to plan an integral and hightly visible role in shaping the quality of the corporation.

Information is the critical enabler of total qualitymanagement (TQM) More and More successful companies agree that information technology and information systems serve keys to theiry quality success. Conversely, this component of TQM is frequently the roadblock to improve. Real issue maybe better quality of information. Dr.Curt W.Reimann, director of the Malcolm Baldrige the award is the lack of proper information system for tracking and improving areas in the remaining award categories.

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INFORMATION TECHNOLOGY:

Systems design may be constraint, but information technology (IT) is not. The geometric acceleration of development is well known and can only be described as dramatic and spectacular. If industry is capable of absorbing the technology, a further increase in the sophistication and importance of information will occur. Capital and direct labor will continue to be sources of value added, but the proportion contributed by intellectural and information activity will increase. In deed information can be considered to be a substitute for other assests because it can increase the productivity of existing capital and reduce the requirement for additional expenditures. It should be exploited.

Check your Progress

5. How Japanese are the pioneers in quality control?

In 1990 Federal express spent more that 243 million on It. CEO Fred Smit stated the IT is absolutely the key to the organizations operations and that the entire quality process depends on statistical quantification which. in turn depends on IT information is generated for both employee and customers.

Decision Making:

The ability to make decisions quickly has always been critical to management at all levels and information is essential to the process. It has emerged as crucial completive weapons. You middle managers. Who are the real change agents, spend most of their time exchanging information with subordinates, peers, or the boss, leaving little time for customers or for innovation and change. In the Jargon of information systems, they need a decision support system.

Information Systems in Japan

In what continue to be customary comparisons between the United States

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and Japna,· it is useful to examine how IT and information systems are perceived in Japan. Japanense executives believe that customer satisfaction drives the development of new services and products and that it can be a vital means to facilitate strategies and operations to this end. In true Japanes faship, this view is apparently promoted by the national government as well. To build a foundation for future technicians and managers. The Ministry of Education has implemented national education policies for the full-scale use of computers in education. There is also national policy on software. The Ministry of international Trade and industry (MITI) has launched the sigma project which calls form computerizing the software process and industrializing and computerizing software production.

The Deming prize is awarded each year to Japanes companies that demonstrate outstanding improvements' in quality control. Yokogawa Hewlett Packard *YHP) a joint venture of Hewlett Packard and Yokogawa Electric Works, was awarded the prize for an information systems approach that yielded dramatic increases in profit, productivity, and market share.

Answers to Check Your Progress

1. Culture is the pattern of shared beliefs and values that provides the members of an organization rules of behavior or accepted norms for conducting operations. It is the philospphies ideologies, values, assumption, beliefs, expectations, attitudes, and norms that knit an organization together and are shared by employees.
2. For example, Ford , the belief is quality is job one and for Delta - a family feeling.
3. Sender-------------------------------Message----------------------Receiver
4. Information is the critical enabler of total quality management (TQM) More and More successful companies agree that information technology and information systems serve keys to their quality success.
5. All the contributions of TQM were formulated by the Japanese only . Tools such as kaizen, 5S, JIT were conceptualized by the Japanese.

REVIEW QUESTIONS

1. What is TQM system?
2. Define Quality culture.
3. What are the principles of sound communication?
4. Explain the role of Information system in TQM.

STRATEGIC QUALITY PLANNING

UNIT STRUCTURE

3.1 Strategic information systems

3.2 Shortcomings of accounting systems

3.3 Management Of Process Quality

3.4 Policy Deployement

3.5 Quality Function Deployment

3.6 Quality audit

3.7 Design review

3.8 Swot analysis

3.9 Quality control and quality costs \

3.10 Stratification

3.11 Frequency distribution and histogram :

3.12 Control charts:

3.13 Process capability

3.14 Answers to Check Your Progress

3.15 Review Questions

UNIT OBJECTIVES

1. To learn the various types of Information Systems
2. To understand the diagrams and process charts. Policy deployment
3. To understand the quality control and quality costs
4. To learn the Control charts, Customer focus and satisfaction, Business cycles and TQM

3.1 STRATEGIC INFORMATION SYSTEMS

The integration of management information's systems (MIS) with strategic planning has been suggested as necessary prerequisite to strategy formulation and implementation. If we assume. as w assume. as we must, that the basic requirement of a strategy is environment al positioning in order to meet customer requirements and if we further assume that the ultimate purpose of

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each function and process within an organization is to contribute to strategy, the role of information becomes clear.

The value chain is a useful for demining the structure and processes needed by organization in order to achieve a competitive advantage, keeping in mind that competitiveness is decided neither by the industry nor by the company, but rather by the customer.

Beginning with the customer, integration of processes and information can proceed as follows:

1. Identify the market segment in which you want to complete.
2. Use data collection and analysis to define the customer requirements in the chosen segment.
3. Translate these requirements into major design parameters to develop, produce, Deliver, and service the product that meets the customer's requirements. These are the primary functions and activities (processes) of the value chain.
4. Complement the primary processes with support activities such as planning, finance and accounting, MIS, personnel, etc.
5. Subdivide or "explode" the organization design parameters into the processes (functions, activities,etc)that are necessary to achieve the quality differentiation.
6. Design the information requirements necessary to manage each process and integrate all processes horizontally.

Check your Progress
1. Define: Strategy

The support activities are sometimes taken for granted and their linking potential is often overlooked. Moreover their potential contribution to differentiation may not be relized. Marketing services, for example, when combined with the customer's expertice,can generate differententiated product and service opportunities. The customer will place high value one supplier who delivers the right information quickly. Engineering services, usually perceived as a commodity product can also differentiate a firm. In both cases the information systems support is cost effective.

At, Hoeywell, Inc, translating-long-term strategy into tactics that enhance short-term operations has resulted in new approaches that have shortened cycle time, improved quality and reduced costs. The approach involves spreading information, standardizing and measuring performance.

Environment Analysis:

Strategy formulation requires an analysis of the different environment: general industry and competitive. One study found that small business owners spend over the forth of the day in external information search activities. Competitive information is particularly valuables but is difficult to obtain. In general the minimum information needed about competitors can be related to how they stand on the key success factors for a market segment. These may differ by industry and segment but usually include the following:

Market share	- Growth rate
Product line breadth	- Distribution effectiveness
Age and location of facility	- price competitiveness
Experience curve effects	- Value added
Rand advantage and position	- Cash throw-off

Porter has identified the information needed for positioning in an industry and in a chosen market segment, and his system is widely used. His categories are

(1) intensity of rivalry

(2) bargaining power of buyers

(3) bargaining power of suppliers,

(4) threat of substitution and

(5) threat of new entrants.

Each category includes a number of elements or subtopics that should be determined and tracked with some type of information system.

Central to all information relating to strategy formulation and implementation is need ot define and measure the concept of quality of product and service as determined by the customers. This step is fundamental to positioning and subsequent follow up

3.2 SHORT COMINGS OF ACCOUNTING SYSTEMS.

Financial information is perhaps the most widespread indicator of performance. And for many films is only indicator. Critics of accounting systems claims that theydo not really support the operations and strategy of the company, two dimensional in which quality plays a dominant role. Despite the widely held conclusion that we are in the information age, management accounting would probably be labeled inadequate by managers who seek to support company operations and strategy through improvement. This is increas-

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ingly evident in the "new" manufacturing environment which is characterized by the trends and implicatins listed in table.

Trend	**implications for quality**
Focus on manufacturing strategy	Quality rapidly becoming the central competitive edge of strategy
Production of high quality goods	Qualtiy directly related to market share, growth, profits
Reduction of inventor levels by	Reduction of costs associated with excess inventory Just in time inventory
Tight schedules	Improves availability to customer, another Competitive edge perceived as quality by the customer
Product mix and variety	Allows focus on strategy and market segmentation.
Equipment automation	Provides justification for quality and productivity Improvement
Shortened product life cycle	Provides opportunity to expedite market shifts and Incorporate new technologies into the product, but Impresses additional stress on the quality Management program.
Organizational changes	Responsibility for quality delegated to strategic Business units and product managers.
Information technology	Allows greater control of cost of quality, quality management, And cross-functional integration.

Accountant basing is becoming increasingly popular in the management literature. The trend is symbolized by Harvard Business School Professor Robert Kaplan in his popular book Relevance lost. He concludes that today's accounting information provides little help in reducing costs and improving quality and productivity. Indeed. he suggests that this information might even be harm ful,Peter Drucker.another critic.decribes some of the shortcoming that ate generally recognized :

1. Cost accounting is base on a 1920s really. when direct labor was 80 percent of manufacturing costs other than raw materials. Today it is 8 to 12 percent and in some industries (e.g.IT) is about 3 percent.
2. Non -direct labour costs,whch can run up to 90 percent, are allocated in proportion to labour costs, an arbitrary and misleading system. Benefits of a process change are allocated in same way.
3. The cost system ignores the costs of non -producing whether this be downtime.stockouts, defects,or other costs of non - quality.
4. The system cannot measure, predict or justify change or innovation in product or process. In other words, accounting measures direct or real costs and not benefits.
5. Accounting -generated information does not recognize linkages between functions, Activities or processes.
6. Manufacturing decisions cannot be made as business decision based on the information provided by accounting. The system confines itself to measurable and objective decisions and does not address the intangibles.

3.3 MANAGEMENT OF PROCESS QUALITY

TECHNIQUES FOR IMPROVEMENT

The success of improve mint projects depends on managerial actions. An essential step is to improvement measure and to enhance the capability of the improvement terms to keep them motivated to accomplish the assigned tasks. Bridging their knowledge and skill gape in application is an important requirement .commonly used tools and techniques are grouped into two as follows:

GROUP 1: TEAM TECHNIQUES

1. Flow process charts and flow diagrams.
2. Gantt charts and arrow diagrams,
3. Net works
4. Policy deployment and management
5. Quality Function deployment
6. Quality Circles
7. Quality Audit
8. Design review
9. SWOT analysis

10. Quality costs
11. Managerial Tool

GROUP 2: INDIVIDUAL TECHNIQUES:

1. Cause - effect analysis (Ishikawa diagram)
2. Check - sheets and graphs
3. Stratification
4. Pareto diagram
5. Frequency distribution and histograms
6. Control chars (product and process control)
7. Process capability
8. Scatter diagram
9. Statistically engineered experiment

3.3.1 DIAGRAMS AND PROCESS CHARTS

This is a basic tool commonly used for work simplification. The first step is to critically

The process system as a whole. Relative to the end objective kept in constant focus. element (sub-process)is connected to the following element till the end. and the

3.3.2 MANAGEMENT OF PROCESS QUALITY

3.3.2.1 TECHNIQUES FOR IMPROVEMENT

The success of improve mint projects depends on managerial actions. An essential step is to improvement measure and to enhance the capability of the improvement terms to keep them motivated to accomplish the assigned tasks. Bridging their knowledge and skill gape in application is an important requirement .commonly used tools and techniques are grouped into two as follows:

GROUP 1: TEAM TECHNIQUES

12. Flow process charts and flow diagrams.
13. Gantt charts and arrow diagrams,
14. Net works
15. Policy deployment and management
16. Quality Function deployment
17. Quality Circles
18. Quality Audit

19. Design review
20. SWOT analysis
21. Quality costs
22. Managerial Tools

GROUP 2: INDIVIDUAL TECHNIQUES:

10. Cause - effect analysis (Ishikawa diagram)
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18. Statistically engineered experiments

3.3.2.2 DIAGRAMS AND PROCESS CHARTS

This is a basic tool commonly used for work simplification. The first step is to critically

The process system as a whole. Relative to the end objective kept in constant focus. element (sub-process)is connected to the following element till the end. and the actual process flow is charted and then evaluated for relevance. importance and contribution the end result.

Typical questions asked are : What is the precise purpose of each element? What has it accomplished ? Can the process or sub-process (set of elements) be eliminated? Do the activity person, machine, material or process available make a better product; service or lower the cost? The key in this approach is to first look at and link the elements with the overall

Objective.

An important improvement project is first picked up. The flow chart prepared might show the time; distance, person and place for each element. activity or process that affects the objective set forth in the project. Relative to that objective, clear-cut start and end points are decided. Data is then charted in a specific format. It is important that actual data on elements, activities or sub-processes as they happen or happened are recorded. Often random sampling of past records can be put to use supplementary to on-line surveys, to

arrive at valid data for. the flow chart. In studies where the material, person moves from place to place, a picture of the movement is shown in a flow diagram. To avoid confusion, usually important activities or processes are. shown in the diagram. A summary is finally made of an overall picture showing critical sub activities / processes'. With this as the basis. discussions and exercises begin to effect improvements.

Applications : 1.To analyse business, managerial / administrative and technological processes relative to the company goals. 2.To rationalise and simplify organisational systems, command structures and planning. 3.To guide and monitor policy control relative to quality, delivery and cost.

Benefits : 1.Improve qualiky 2.Prompt delivery 3.Lower cost, lower inventory, comprised cycle time and improved cash-flow and profitability. 4.Effective and responsive organisational systems.

GANTT CHARTS AND ARROW DIAGRAMS The Gantt chart is a graphical method for planning and controlling project and production activities and times. It is widely used in variety of forms in organizations to detect delays against planned schedules and apply remedies to control and prevent their recurrence.

Typically the Gantt chart has the structure of arrows. The arrow diagram shows the sequence in which the activities are carried out, which is an advantage over the Gannt chart.

Numbers in circles in the figure show the activities or operations. Numbers along the arrows show the duration that each circled activity or operation takes to be a ready for the next one the direction of the arrow the indicate the sequence.

The design prepared will help 1. To identify critical operations, processes or activities, 2. To monitor schedules and prevent hold-ups, 3. To assess overall time-schedules and evaluate cost and delivery implications

4. To plan for effective resource deployment to accomplish the targets or goals of the organization.

1. Diagnosing quality problems, wastes and non-value added activities or operations and for planning as well as organizing improvement exercises,
2. Pin-pointing bottlenecks (critical barriers) and arranging timely remedies to overcome them.

NETWORKS:

Network methods aid in the efficient management of various types of projects, which con-sist of inter-related and complex activities / operations, to accomplish specified goals. The arrow diagram in the figure is a typical, simple network. Unlike the Gantt charts, network methods show inter-dependencies among the activities or operations. Computers are often used for large projects in networking to assemble.andeort the information to provide scheduled times, earliest and latest start dates for.each activit. with asso-ciated time-costs. The critical activities and their assembled linkage in the sequence and duration shown in the network would give a measure of time to accomplish the end objective. This time-based path is also known as Critical Path (CP). The method as-sumes known duration, and is termed as the Critical Path Method (CPM). In Program Evaluation and Review Technique (PERT) and CPM, from which the network method was developed, activity duration is estimated by the probabil-ity distributions. Examples are R and D exercises or projects, 'Which have an ele-ment of uncertainty in accomplishing the goals

. Network methods are useful for :

1. Diagnosing quality problems, wastes and non value added activities or operations and for planning as well as organizing improvement exer-cises.
2. Pin pointing bottlenecks(critical barriers) and arranging timely remedies to overcome them
3. Determining, as the work progresses, whether or nct the delivery sched-ule can be accomplished as per commitment and budgeted cost,
4. Reducing times and cost
5. Achieving and maintaining other production and flow.

Applications :

1. Planning and scheduling
2. Business and manufacturing activity and time compressions.
3. Implementation of Just In Time (JIT) inventory system,
4. Erections, commissions and maintenance activities,
5. Commercialization of products.
6. R and D
7. Bids (tendering)
8. Production management.

POLICY DEPLOYMENT

1. The creation of environment conducive to deployment
2. Sustaining the hierarchical motivations
3. Planning and scheduling of activities,
4. Equipping the teams with the improvement tnnic ariel tAthniques.'
5. Monitoring, reviewing the progress
6. Implementing the recommended suggestions
7. Supporting the morale
8. Constant renewal of effects for continuous improvement.

3.4 POLICY DEPLOYEMENT:

This is an emerging approach for goal-bound systematic breakdown and deployment targets and the pile of work (activities) relative to the specific targets, to the various expulsive OC M(levels (owners of problems or improvement projects duly prioritized), The supporting re5w4 react groups, such as Quality Improvement Technique (QIT) for achieving all-round customer satisfaction and enhancing the growth and the competitive strength of the organization are added advantages.

Issues such as quality, delivery, service and cost (profit) that affect the company and customers are taken up by the policy management. Specific policies and are derived are then deployed following a protracted process and implementation secured through a Company-wide consensus process. Owner's' are identified for problems and processes that haw direct linkages with the targets and corporate goals, and with their teams and resources, focus on improvement exercises to achieve time-bound results.

The approach works on a participation principle. In addition to external customers and satisfaction, internal customer's requirements receive due attention in policy deployment. congruence with the goals is thus achieved:

As in other managerial exercise, effective implementation depends on

1. The creation of environment conductive to deployment
2. Sustaining the hierarchical motivations
3. Planning and scheduling of activities.
4. Equipping the teams with the improvement tools and techniques.
5. Monitoring, reviewing the progress.
6. Implementing the recommended suggestions.

7. Supporting the morale
8. Constant renewal of effects for continuous improvement

3.5 QUALITY FUNCTION DEPLOYMENT

This is also an eve loving approach but largely confined to quality specififc exercises. QFD consists of a series of specific in company exercises to convert customer requirements and specifications into appropriate technical characteristics. And parameters to enable design. Technology, process, production, quality, and service engineers and specialists to achieve compliance with the requirements. in the company at an economic cost.

In custom built products, the QFD translation process would involve.

R and D. Marketing, commercial and technical or engineering specialists.

The exercises would typically pinpoint the product. The process and the activity elements that directly affect the customers requirements and enable derivation of the priorities (critical major or minor) for total control. IN the process. quality planning. waste elimanination, prevention of non conformance at source. rational deployemt of inspection, test and assurance effects be come effective.

With the approach implemented, defect free fault free product and services come within reach at the company as an attainable objective to sustan total customer satisfaction.

3.6 QUALITY AUDIT

It is a management function aimed at verification of the quality system to determine wheter the activites are being carried out as per the polices and procedures in the company.

Products and processes are also audited as applicable according to customer requirements.

Non conformance are brought out and discussed with the functional heads to secure corrections and compliance.

Top management audit annual or bi-annual, is an effective approach to assure conformance as per applicable systems, procedures and standards.

Beside such internal audits, statutory and sometimes authorized third party audits are carried out covering the systems, processes and products to verify compliance with the applicable statutory or contractual provisions.

NOTES

3.7 DESIGN REVIEW

This is a technical audit, which verifies if the design of the products and systems is being carried out to comply adequately and ecnomicaly with the contract or customer requirements. The review is conducted as per the companys procedures depending on contractural requirements, the review might be conducted by representative drawn from design, R&D, marketing services QC/QA and production engineering. The group may exercise at various stages of design including the concept, prototype, validation through modification and customer approval.

A few state of the art tools are useful employed in the review such as the Failure Mode Effect Analysis(FMEA) and optimization tools, including in parts, the taguchi methods.

Reliability evaluation and assurances are frequently employed in design and its review well-developed tools and approaches for the purpose are outlined in several publications.

Design review would provide on objective basis and effective upstream control co assurance as well as quality planning activities.

Check your Progress

2. What do you understand by SWOT analysis?

3.8 SWOT ANALYSIS:

Analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT) is an open-how brain-storming approach employed o as an effective participative device in resolving the TQ problems that a company faces in its business and management affairs. Persons from the. level of managers and above can attend the SWOT sessions. Ea member can actively participates in the deliberation. The views expressed are expected tot objective, rational and logical. The moderator explains the, procedures in SWOT discussion without hesitation and invites the members to express free and frank views on each of the for aspects,

In the scheduled time slots the moderator records each view in a flip chart specially designed for the purpose. The statements are distilled into points. Repetitions are weeded out .Similar points are combined. A final list of strengths, weaknesses, Opportunities and Threats are arrived at as a consensus. The tally of edited points is then appropriately scored. The top ten strengths. weaknesses, opportunities and threats are prioritized for focus.11 scoring and ranking is based on individual secret voting on a separate sheet which contains summary of all the points. Group influence is avoided In the process. The four

following working groups are constituted to evolve strategies and plans. 1. strength-opportunity group 2. Strength-threat group 3. Weakness-opportunity group ..4. Weakness-threat group In the last group, a few key executives may be present to participate in the discussions. After independent deliberations, the groups re-assemble for joint interaction The group leaders elected by each group present the group consensus on strategies and plan: the open house. The final action plan will emerge from these discussions. Short-term and lot term plans are also categorized. The unit chief will follow the implementations.

3.9 QUALITY CONTROL AND QUALITY COSTS

Rejects, reworks, off-grades, wastes, returns, delays and concessions are internal to a company and are generally assessed, monitored, improved and controlled Losses to Customers arising sometimes after the products are sold have not always received equivalent attention for assessment. It frequently turns out that customer losses are more due to non-serviceability and non-availability of the products in use. They arise not only from the readily detectable non-conformances due to manufacture, but also from design deficiencies which are manifested in maintenance, replacement and operational phases of the product. (For example, in capital equipment, for every unit of internal loss, field losses work out to as one hundred units. The scale of such losses, however, varies from product to product and user to user).

In loss assessment, a conceptual aspect of vital. significance has yet to receive attention in industry. Mere conformance against stipulated engineering tolerances however confidently achieved at the producer's end, dose not hold the assurance that all the products shipped would extend equitable performance satisfaction at the user's. end. Clearly. customer losses have to be monitored more closely on a sort of producer-customer trusteeship arrangement . at least on a selective basis. to explore durable improvements for the benefit of both. In the case of utilities and capital intensive product, some progress has been achieved in this direction by reputed multinationals across the world. In addition the prevailing concepts of acceptance and rejection and approach to control require re-appraisal in terms of customer-specific losses. In the TQM perspective, basis exercises have to be persuaded to review the adequacy of the classical quality costs' elements and evaluations which seem to have quality-specific bias. The costs are often turned inwards in company assessments. Even here, losses arising from non-conformances in deliveries, uneven flows

of components and problems causing downtime or under-utilization of equipment and inventories only are typical of the broader items that have yet to receive adequate attention. Toluene's concepts or losses have highlighted some of the issues. Much work needs to be done to formulate practical guidelines for top management in the exercise tore organizing corn, penny-wise improvement in quality losses on a more realistic framework.

CAUSE - EFFECT ANALYSIS

This is a tool employed in diagnostic exercises in quality improvement. It expresses in 4 composite form the break-up of causes known to affect the end-result (usually a defect) in an inter-related diagram

CHECK - SHEET AND GRAPHS

These are the other simple tools employed in data evaluation and diagnostic exercises. Check-sheets are of various designs tailored to map out defect-occurrence patterns.

Graphs include single and multi-line bar charts and component or divided bar charts and pie-diagrams which give visual display of source-wise contributions to variations or defects in quality evaluation and improvement exercises.

3.10 STRATIFICATION

This is a process by which data collection is structured with respect to the possible sources of variation or defects in the product or process.

Machines, Suppliers, operators, tools, gauges or time -dependent sources likes shifts, pre-post lunch, start or end of shifts, etc. are strata with respect to which the study of variations is conducted for diagnosis and possible prevention of variation or its control.

3.11 FREQUENCY DISTRIBUTION AND HISTOGRAM

Frequency distribution is a statistical tool for summarizing quality data on specific charac-teristics. The raw data in measurements or numbers as in defects or defectives recorded from inspection and test, is by itself not likely to convey meaningful information about the nature and extent of variation about the quality characteristic under consideration.

Frequency distribution is a practical, convenient method. The distribution yields a pattern of variation, and from a study of the pattern, it is usually possible to detect lack of homogeneity in quality.

3.12 CONTROL CHARTS:

NOTES

Welter A. Shewart, the father of statistical quality control. invented the graphical method W.CV-Wolfing variation in manufacturing process in 1924 while working in Bell Telephones Laboratory; The method known as control chart. is a simple graphical device to distinguish between variations intrinsic to a process or operation system and variations external to the system. with repeat 19 the 'Characteristic under observation,

Control limits are calculated based upon the inherent variations observed in the system.

The limits provide the basis for judging whether or not the process/ operations is under control. The limits are reference guides and are calculated as per prescribed procedures, based

Variations deemed inherent in the system. When the limits are violated by the sampled predicts drawn from .the process-production stream. control action taken to Arrest intervention of to the usual cause system. Turns out certain are-based upon patterns of variations derived from consideration of statistic-cal distributions. For in3tance., when only natural or chance variations from the production or process sys-tem influence the measurements of a quality characteristic. the pattern is predictably bell-shaped :Note: Pistons smaller and larger than the nominal diameter are progressively fewer in number, nearly none beyond l SI and I 'SL. White those at and close to the nominal are more in number.

Check your Progress

3. What for GANTT charts are used?

The figure shows that the system turns out certain measurements of the quality character-istic most frequently (evidenced by the hump) and as the measurements spread, The hump flat-tens and 'Mils' off at the ends. Beyond the two tails (extremities) of the spread, we rarely find observations of the characteristic.

Departure front the pattern signify lack or loss of contrdloof production Or the process

System. This is so even when the control limits are not actually violated by the sampled Observations.

Distribution patterns vary. As a result, control limit also vary depending upon the nature of the characteristic such as dimensions (measurement), defects or defectives in 'production and pr the sample sizes of products from. the stream like one, two, three etc. Drawn for control assurance or evaluation purposes. Based on such statistical consider, § of control limits, and well-

developed procedures applicable to a variety of control situation are available in standard published literature. Useful educational and training software packages are available for control using statistical o or process control (SQC or SPC) with rich case material and ready - application software. With the advent of online computers and instrumentation gadgets, impressive advances hays been in recent years in automation, process. production control and integrated ot4ity ,Hrance software systems. In the integrated control system exercise, control chart concept§ and operations have been effectively incorporated. It has opened up new avenues for yogr.:Oino of gouty technology in this field. Q9114 Ph@f1§ have Upon adapted and developed in various forms to suit Applico9ri.§. They include control charts for measurable quality characteristic! such as Dimension§ including polity, eccentricity, taper, sloping control charts for tool wears, Per cent purity of impurity, yield, ptp,.

CONTROL CHARTS - APPLICATIONS

A control chart is both a diagnostic and a control too! applicable to a variety of situations

Some of the important uses are given below.

1. Prevention of defects.
2. Control of processes.
3. Achieving and maintaining consistency in quality.
4. Aid to duality planning.
5. A as for reviewing design tolerances for manufacturability.
6. A tool for grading of products
7. An evidence for quality auditors, assures or third party inspections
8. Aids improvement of processes.

Effective aid for production workers and supervision for doing the rig thing right always 10 Apportioning of responsibility levels for control. assu nce and improvement

Benefits

1. improvement in productivity.
2. Smooth production flow
3. Monetary savings are the direct visible effects.
4. Improvement of shop morale is the intangible result.

3.13 PROCESS CAPABILITY :

This is a computed estimate of process or machine variation deemed inherent in the process or machine system when it is working in a state of statistical control ai already described in the section on control charts. Process capability, or machine capability as it is sometimes referred to, is put to wide-spread use, such as planning and loading the jobs, evaluation of tolerances, setting design specifications relative to capability, design of process or machine system, machinery or instruments, process maintenance, purchasing, and reconditioning of machines. and serves as a basis of process/ machine performance optimization studies and development. SCATTER DIAGRAM

The scatter diagram is a simple graphical device to depict the relationship between two variables.

Correlation measure the strength of the relationship. Knowledge of such relationship helps to

1. Replace expensive and time-consuming inspection and tests by cheaper and quicker tests
2. Replace destructive tests with non-destructive ones
3. Institute requisite control at certain operations or processes based upon a calculated relationship study and regression analysis of corresponding control characteristics at sub-sequent operations or processes 4. Evaluate the relative importance of process factors for control base on their strength of relationship with the end response such as quality and output Find optimal factor levels from as assessment of relationship with the quality or output characteristic.

3.14 STATISTICALLY ENGINEERED EXPERIMENTS:

Quality Improvement and cost reduction are the perennial objectives that support busi-ness missions. In addition. rapid advances' in technology and product development have been constantly threatening obsolescence of contemporary manufactures and Weakening of the business. . In such an environment, management has to sustain their strength and effectively compete in the race for leadership. Finance and engineering man Ooweris not adequate. We need efficient, inexpensive methods to design and develop products and processes economically at quality lev-els desired by customers, and commercialize them faster than competition to gain a leading edge and customer acceptance in the market-place. Statistically engineered experiments provide an answer to

this challenge. The traditional approach of trail and error is no answer. Experiments may drag on for years. The company may still be up against series of ever new hurdles. Statistically designed experiments provide a scientific and efficient basis for the improvement exercises. The essential feature of the approach of simultaneous& consideration of a large number of -or sometimes all-. variables thither thought to affect the quality, cost or output of the product or process systems. The design which permits such an exercise is put to work with the variables scientifically packed in it. After a few experiments, it is usually possible to isolate a few dominant variable § that have the largest contribution to the objective number consideration. Once we are through with this 'filtration process', the time and the task required to reach the final result can be substantially cut down. At the same time. reliability of the results can be greatly enhanced in arriving at the optimum result. The approach is practical, fast and inexpensive, and applicable equally to small and big business. Upstream control is gaining of the top management and engineering specialists all over the world. Detecting a non-conformance and repairing or preventing it at the production or past-production stages is increasingly becoming costly, sometimes even impossible, especially in the global marketing ventures. On-line automation has rendered this task even more difficult and prohibitive. The question is serious as to how best and how soon can the product or system be designed to make it defect-free in manufacture and fault-free in operation during its designed life-span at the customer. Site. Designing of experiments is a proven reinforced approach for the purpose. The approach doe4"draw liberally from specialists' knowledge and skills including gut feeling and guesses but never depends on them entirely in the improverient and diagnostic exercises. The experiments are not wasted when hunches go wrong as they often do. but then with the objective information thrown up from theer Atical results, further erciaer5 confidently proceed with risky hunches. eliminated.

EXPERIMENTAL DESIGNS'

If the product and system design is first made defect-proof from the reducibility and oper-ability angles, TQM can make rapid strides to avert crises in inspection and testing, quality control and assurance in production management. The bulk of the effort is transfornied into verification and confidence building demonstration exercises. Design review is a specialised effort in upstream control. The basic aim is to make the design defect-free and economical Statistical engineers have developed several types of designs together with the associ-ated methods of analysis and evaluation of experimental results. The

diversity of application has been one of the compelling resents for the variety of designs. Improvement of validity of results for effective implementation and reproducibility in commercialisation has been a second. consideration. Reduction of time and investment on the experimental project has been yet another factor.

The design structures and data evaluation procedures and methods are too numerous to be men-tion. Considerable literature is available on the subject. The Orthogonal Array (0A)-method is a part of the statistical design of experiments largely popularized by extensive application by Professor Gertichi Taguchi from Japan. Professor Taguchi propounded certain concepts on quality and societal loss, robust quality, concurrent design of ex-pediments and applicable data evaluation methods. These are called the Taguchi methods. Essentially the Taguchi concept involves economically designing the product to make it insensitive to 'internal noises' in the manufacture and 'external noises' in its useful operational service to customers. (Noises' are adverse effects of variables operating in the internal or external systems.) Achieving and sustaining closeness to the target in the product characteristic is the aim. and departure from it at any stage, be it in making or operational phase of the product means loss of quality measured in terms of variations with respect to target, based on statistical consider-nations. The larger the variations, the greater is the loss both to the manufacturer while making the product and to the customer who uses the product. Professor Taguchi has developed systems of experiment based on the OA principles to tackle simultaneously the effects on quality of both the engineering factors and the environmental aspects that affect the product. Certain data evaluation procedures have also been developed suitable to various applications. To guide the `packing' in design of factors whose effects need assessment in the experiment, several OA tables and linear graphs have been developed and published. Technology advancement and optimization exercises have been receiving global attention in recent years. R & D. engineering, qu6lity and market-ing specialists are the Prime participants in the exercise. Top management are also increasingly aware that Investment in this area will pay rich dividends. Design and analysis of experiments is a valuable tool that does not call for much investment and yields positive results.

3.15 CUSTOMER FOCUS AND SATISFACTION .

Product quality has been the major focus of quality-control operations for many years. Defect prevention as a company-wide activity has begun to

gain widespread attention only re-cently. There have been persistent gaps. however. in the effective implementation of defect pre-vention (zero-defect) programmes. The set structure and accountability patterns of factories have been a kind of barrier. Quality control (inspection) is still regarded as the designated agency for the detection and prevention. of defectsr a software gap can be traced to certain deficiencies in the improvement processes in achieving the zero-defect objective. Here is a typical case study that brings out the importance of a few aspects to quality A factory supplied rotary equipment to customers for certain application. The customers had been complaining of a lack of consistency in the performance, as the equipment suffered breakdowns and sometimes posed difficulties in preventive maintenance. The factory in its preliminary studies identified that one of the rotary parts had been frequently replaced by the customer. The part in question at the factory had the drawing specification 35,50+ 0.05 mm for its Outer Diameter (OD) at grinding. This was a key assembly component The part in assembly had been held in stock- as the matching components with appropriate dimensions were not readik available. From the picture of breakdown and wear-out assessments. the factory decided to study the center less grinding in some detail. The parts were ground center less by the two operators. and the OD measurements from the production of two streams were separately summarized .

The inspection department had passed the entire production as acceptable. In its checks. the parts had all conformed to the specified limit of 35.45-35.55 mm. in effect. it was deemed a zero-defect situation. The study team. however. noted certain observations from the visual pictures.

1. Although all the parts were within the acceptable limits. the first operator feebly wandered within the "legislative" band given by the designer.
2. In contrast. the second operator seemed successful in meeting the target of 35.50 mm and holding on close to it during his run of production.

The study team observed that the production of the second operator was more "consis-tent" judging from the spread of diameters around the target. For sometime. the team followed up the production of the two operators at assembly and at customer site. Over the period of time. the assembly stock for the second operator showed a sharp reduction. Also. fewer replacements and breakdowns were reported in the equipment sup-plied with the parts of the second Operator.

3.16 CONCEPT OF ZERO DEFECT

The fact that in the normal course, the parts having zero-defect in terms of specification limits, do not by itself guarantee customer satisfaction. Parts produced to higher levels of consistency (judged by reduced part-to-part variation) bring about a new situation. Zero-defects, in the changed. situations have more stringent acceptance limits, signaled by greater satisfaction to customers (internal as well as external). The exercise bring sharper focus to explore a newer basis for understanding zero-defect. Improved customer satisfaction and greater economy provides a workable, tangible basis for avenues of continuous improvement which is a process by itself. The exercise bring attention on more basic issues that referred to the very definition of zero defects and the kind of efforts needed to impart Similar patterns everywhere. Situations of some kind underpin the need to link up improvement prospects in a continuous process in terms of lasting customer satisfaction and in-house loss prevention. However, it is not an easy exercise in developing economics. where technology is largely imported. Know-Why and Know-how of the specified acceptance limits are not readily questioned. To review and revise them on Objective ground does involve broader managerial processes covering R & D, design, technology, marketing, production and quality engineering specialists. There are, however, Interms of improvement efforts, the concept of zero defect will continually undergo changes over time. This however, does not mean that at any point of time, we should not have a specific policy for zero defect performance. That would amount to abandoning the path of effective implementation of the company wide quality improvement program me.

DELIVERIES AND CUSTOMERS:

Delivery of the right products and services on right time is critical for customer satisfaction this aim often suffers despite its importance.

Criteria that commonly affect untimely and delayed deliveries are as follows:

1. Emphasis on plant utilization by somehow keeping the machinery and men loaded at the cost of timely deliveries of products that the customers want.
2. Scheduling the product mix which yields a higher value of turnover to meet committed growth without adequate regard to market needs.
3. Deficiencies in market forecasting.

4. Bottlenecks that affect the flow of products that customers want
5. Deficiencies in planning and progressing
6. Chronic quality problems that cause uneven flow.
7. Ineffective services.

Quality processes are applied fully to prevent defects for preventing non conformance in the committed delivery and service schedules. Cross function and departments processes have tobe mapped in the way they are happening and not in the way they are supposed ot happen effective linkages with customer driven schedules have to be chalked out. Managerial actions must be taken to monitor and improve them to prevent non conformance. Specific policy aimed at meeting customer schedules and deployment measures for implementation will give a long way in acheiveing tangible results.

QUALITY LOSSES:

Quality losses arise from internal and external sources. Traditional areas for improvement manufacturing of non conformances to specifications. Rejects, reworks, downgrades wastes, returns, and replacements, and delays, inventories, cycle times and field losses to users add substantial costs. These are often caused by obscure quality problems in factories. Activities that do no add value are often the source of significant cost escalations. (Refer: Cost of quality)

Check your Progress

4. What is QFD?
5. What is a quality audit ?

Elegant techniques are available to lower costs, improve quality and add value to product alert management can achieve greater success in these areas by organizing waste reduction projects and value engineering approaches.

FUNCTION ANALYSIS

Flow charts and project management techniques are effectively used to evaluate business processes and analyze the function on the basis of how they are actually carried out and not on the basis of what they are supposed to do relative to customer requirements. Based on the results, the activities and processes are restructured to reduce cycle times, speed up deliveries. Cut inventories, improve schedules and achieve overall effectiveness In business operations with respect to quality, delivery and cost.

PEEF CYCLE

Plan execute, Evaluate and follow up (PEEF) cycle is to determine the course of action is an accepted management approach in improvements. Evaluation would be good start, based on which the cycle of improvements can be

chalked out. Policy deployment is a term that is gaining widespread acceptance to describe in details the steps that constitute the PEEF cycle. This cycle needs to be repeated several times to bring about continuous improvement in the organizations.

The PEEF cycle is applied to improvement process in the aspects of quality. delivery and cost. In quality plan. do check and Act (PDCA) is a common approach employed for improvement. Quality Function Deployment (QFD) is an approach corresponding to policy deployment to improve quality specific processes in order to meet customer requirements for the product.

PROCESS CONTROL

Statistical concepts are extensively applied to:

1. Evaluate the capabilities of machinery. processes. equipment. instrument, etc.
2. Set up process or machine control procedures to achieve conformance of products as per drawing specifications.
3. Assist production. design. engineering and support services in process improvement and
4. Provide operators and shop floor supervisors with simple graphical aids for effective process control and improvement exercises.

Popularly known as statistical process control (SPC) aims at defect prevention at source.

Troubleshooting:

Non-conformances. wastes and excess variations commonly account for loss in production. deterioration of quality and high cost of products. Customer dissatisfaction is the inevitable consequence.

Proven quality control approaches are available to track down the causes and aid management action. A simple and practical approach involves.

1. Structuring the data collection linking the suspect sources.
2. Prioritizing the contribution via ABC analysis of the sources
3. Interpreting the data using simple statistical or graphical aids and
4. Evaluating the impact of sources by cost indexing.

In quality parlance, these steps are referred to as stratification. pare to analysis. process, capability analysis. control charts. frequency distribution tally scatter diagram and quality costs. Respectively.

PRODUCTION AND PROCESS CONTROL:

Ideally, products must perform to customers expectations. Products fail and degrade inuse of many reasons, including environmental hazards such as temperature, humidity, dust, etc. IN manufacture too, materials, process factors and skill vary. Against these odds, products must perform to customers requirements and satisfaction. The product must also permit economical manufacture.

The problem is of greater significance and relevance to developing economies, where large scale software and hardware technology is imported for product manufacture. Product developed under different conditions may perform well in one environment and badly in another Making them rugged and economical to with stand the user requirements is important.

When new products or improvements to existing products have to be designed.

(Either ud=under known functional relationship or empirically evolved conditions) the question is how to meet the parametric and tolerance requirements effectively and economically to fulfill customer expectations on quality and reliability.

Problems such as these are easily solved y a battery of well developed techniques and approaches. Some of these are:

The Orthogonal Array or OA (known as the Taguchi method after proesor Taguchi Japanese consults who has extensively applied and developed the OA approach to product an process development system analysis, design review, engineering value analysis, reliability, anlaysis, cost Effect Diagrams, Failure Mode Effect Analysis (FMEA) customer survey market research and design and experimental analysis techniques.

3.17 BUSINESS CYCLES AND TQM

Shrinking cycle time is essential for cost reduction and improved cash flow in business TQM aids in building time cost profile to guide managerial actions to eliminate was full and non value added areas. In order to secure smooth production flow, improve output, cut inventories and add value to products.

Cycle time and quality are inseparable. Anything done to improve quality shows up reduction of cycle time.

Quality covers a lot more than meeting the manufacturing specifications. It turns form the start of negotiations with the customers to the point of keeping the product serviceable to the customers through its designed life.

Through out is simply measured by the number of products sold and the ready cash the business generates from investment. Achieving a faster flow in the cycle would mean smaller investment from business. A key goal of quality improvement is to shrink the profiles all round in the business and departments functional processes.

Flow barriers for cycles

Building the cost time profiles on the basis of what has been happening (and not on the basis of what should happen) is an elementary step for profile shrinking and consequent cycle time reduction. Networking the flow with the actual time and cost is an important approach. "Humps" of "hillocks" are barriers to smooth flow. Some typical cases are given in the following.

1. Unreliable market forecasting.
2. Poor planning and scheduling (based on standard hours instead of actual hours show operators produce "humps" while the fast once cause excess capacity, undesirable depression which is the opposite of hump)
3. Non-standard production processes.
4. Un balanced priorities of management (sub-optimal objective is to some how keep the machines and operators, fully loaded to have higher "efficiency" with attendant work in progress).
5. Larger batch sizes than necessary to balance the actual flow.
6. Non-conforming products, rejects, reworks, excess material stocks, etc.
7. Unrealistic filter points or toll checks for screening defects, non conformances.
8. Delays in inspection or tests, etc.

Assessment through the time-cost profile serves to guide improvements. It also gives practical evidence for people on the job to participate more purposely in the improvement. Such improvements will also pave the way for more value added products and increased cash flow to the organization.

TARGETTING:

Targets shall be realistic, challenging, and positive and subsequent to TQM polices and shall aim at customer satisfaction. Dissatisfaction evidenced by complaints, returns and claims and lack of availability, reliability, etc. in products and services, would be the prime focus for setting and achieving threshold targets which get gradually revised towards total elimination of dissatisfactory elements

A target is a short term (usually annual) performance measure on which all objectives are focused and every effort is directed.

FOR EXAMPLE IF THEOBJECTIVES ARE TO

1. Improve customer satisfaction index from 80% to 90% by next year.
2. Cut warranty cost by 50% from the current level by the year end.
3. Reduce customer complaints by 20% on XYZ product and
4. Improved committed order delivery (COD) index by 30% in the coming quarter then the target must be.
   1. Linked to the TQM policy and the ultimate object if customer satisfaction.
   2. Be realistic and achievable
   3. Improve performance significantly
   4. Be challenging and a result of demonstrated effort, and
   5. Promote improvement as a continuous process in the organization.

TARGETING CONSENSUS

In orders, the targets is set relatively easily and attention to it secured more readly within the organization. The crises may involves recovery process.

A target is an interactive path to the TQM policy. As the TQM implementation is launched it is not unusual to get a 50 to 60% threshold improvement from the prevailing levels. As the process continues, the improvement scale commonly follows the law of diminishing returns. The tasks get tougher as the final stages of policy objectives come closer.

Corporate as an extension of the target is commonly a statement of the companies long term focus objectives. This is usually chalked out by the board or the CEO mission statement linked to markets, growth, profits and other factors. For example, the ABC co. may decide to cut its product failure rate by a tenth of the current level in the next five years, and company many settle on a five a year plan to grow with the industry, exhibit leadership in technology, value and quality, and sustain profitability that funds growth. The main theme would be improved productivity and quality.

MARKETING DEVELOPMENT

Company targets have to be deployed as appropriate and applicable to be achieved by the concerned business group, product division, department, section, machines or the process ownership levels to achieve the targets have to be arrived at, without which the targets would remain elusive.

In classical quality control, defect rates, nominal (draswing0 dimension

or process average quality' with reference to a calculated characteristic (AQ Level, strength, purity leve, etc) commonly regarded as targets to aim at and reach.

For example, an achievable defect rate in a process or production system is worked out by recourse to statistical homogenization, a process which involves elimination of abnormal rates. Linked to assignable causes which do not necessarily form a part of the ususal process production cause system, and therefore (if possible) worthwhile and economical to prevent their adverse impact on performances.

Repeat exercises to detect and prevent abnormal and assignable reasons relative to the preference. That is the target, would bring about continuous improvements, Such an approach to target setting and target control differed from the management budget driven, customer oriented targets.

3.14 ANSWERS TO CHECK YOUR PROGRESS

1. Strategy is a long term approach or long term planning which is essential for all organizations.
2. Strength, Weakness, Opportunities and Threats.
3. GANTT charts are the pictorial representations for loading and unloading of products in a dispatching system of a product manufacturing systems.
4. Quality functional Deployment - QFD consists of a series of specific in company exercises to convert customer requirements and specifications into appropriate technical characteristics. And parameters to enable design
5. It is a management function aimed at verification of the quality system to determine whether the activities are being carried out as per the polices and procedures in the company.

3.15 REVIEW QUESTIONS

1. Write a note on strategic formulation.
2. What are the techniques followed in individual and group techniques?
3. What is Quality audit?
4. Define Quality cost.
5. What is the role of control chart in SQC?

UNIT - IV

HUMAN SIDE OF PROCESS CONTROL

UNIT STRUCTURE

4.1 TQM And Training
4.2 Performance Appraisal
4.3 Training Package
4.4 Quality Focus
4.5 Manufacturing and TQM
4.6 Quality Committee
4.7 Corporate TQM
4.8 Tqm Secretariat Functions
4.9 Team Exection Check List
4.10 Tqm In Tiny Industries
4.11 Reconstitution Of System
4.12 Cause Analysis
4.13 Continous Improvement
4.14 Import Substitution
4.15 Total Business Cycle
4.16 Just In Time (Jit)
4.17 Route Chart For Qc Process
4.18 Antecedents Of Modern Quality Management
4.19 Accelerating The Of Tqm
4.20 The Pioneers Of Tqm
4.21 Cost Of Quality (Coq)
4.22 Short Comings In The Implementaion Of Tqm:
4.23 Introduction To Iso 9000 Quality Mangement System
4.24 Quality Re - Engineering
4.25 Introduction Of Sqc And Spc
4.26 Answers To Check Your Progress
4.27 Review Questions

UNIT OBJECTIVES

1. To understand the TQM-Training and Manufacturing, Quality Focus
2. To learn the TQM secretariat functions, Team exection check list
3. To understand the TQM in tiny industries, Total Business Cycle
4. To learn the antecedents of modern quality management
5. To learn the organizing for quality implementation

4.1 TQM AND TRAINING

Companies consistently underestimate the amount of education and training needed and the time span over which the training support would be required. Many of the TQM concepts force a change in the thinking and skill patterns. Training must also be timed so that users gain experience at the point of use. Different kinds of training must be imparted., appropriate for the needs to interface with the total system or simply to understand how the business Is changing. Some of the training aims at modification in the behavior pattern to adapt to new system. Some must support effective implementation. Bringing new participant up to date is also important.

The package varies with the levels and the target group. Some are concept -oriented and not tool technique dominant. Upper and senior management need to know more about the concepts and the circumstances of use of specific tools and techniques. Operational supervisors and the work-force shall have specific knowledge and practical training on the tools and approach relevant to their purpose.

Two specific situations can be described to illustrate education and training needs. Let us take design and its roll in TQM. Knowing customer requirements is the first step in pursuing quality by design. Quality by design is a powerful concept that applies equally to products and services. It is important that customer needs be fully and precisely determined in order to define reliability is basic to customer satisfaction. Similarly, designing using the right technology and manufacturability draws heavily on the qualiy technology and manufacturability draws heavily on the quality technology, including the area of robust product and process design. These concepts are currently at the leading edge of design quality technology make the product failure-free and insensitive to process and usage "noises".

Feedback mechanism greatly aid in designing for quality at various

stages. The Target group that takes up the responsibility has to be given education as well as in depth training in the tools of quality technology to come out with the robust, cost-effective product the meets the end use of customer satisfactorily.

Target group that takes up the responsibility has to be given education as well as in the depth training in the tools of quality technology to come out with the robust, cost-effective product that meets the end use of customer satisfactorily.

The second example illustrates the importance of education and training to R & D

Management, Infact everyone in the entire R&D enterprise has a role to perform in the total quality job. They must know certain kinds of tools and the rules to use them. Quality and competitive issues, ways of quality improvement programmes. the tools and methods for improving quality, productivity and reliability are covered to this target group.

SELECTION:

Selection is choosing form a group of potential employees (or placement from existing employees) the specific person to perform a given job. In theory, the process is simple decide what the job involves and what abilitities are necessary, and then use established selection techniques(ability tests, personality tests, interviews, assessment centers) as indicators of how the candidate will perform.

The process is not so simple. however, when TQM enters the picture. The job requirement as a mesa a machinist or even a manager can be compared to these requirements. When a company commits to TQM, an entirely new dimension is introduced. The skills and abilities requirement a specific job can usually easily be identified and then matched with an individual. People were suited for operating in a quality climate may require additional characteristics, such as values, personality type, and analytical ability.

Persons working in a quality environment need sharp problem - solving ability in order to perform the quantitative work demanded by statistical process control, Pareto analysis. etc.because of the emphasis on teams and group process, personnel must function well in group settings. Motorola shows applications video tapes of problem - solving groups in action and asks them they would respond to particular quality issue. Presumably this technique encourages self - reaction.

What is perhaps different in the selection process in a TQM environment is the emphasis in a quality - oriented organization culture as the desired outcome of the selection process.

4.2 PERFORMANCE APPRAISAL

The purpose of performance appraisal is to serve as a diagnostic tool and review process to the development of the individual, team, and organization. Appraisal are used to determine recent evels, validate tests, aid career development, improve communication. And facilitate understanding of job duties.

Deming cites traditional employee evaluation systems as one of seven deadly diseases introducing U.S. industry. He states that individual performance evaluation encourages short - term plans rather than long term planning. They undermine team work and encourage competition wrong people for the same rewards. Moreover the overwhelming cause of non -

Quality is not the employee but the system. by focusing on individuals, attention is diverted from the root cause same quality the system.

Many TQM proponents, like Deming, argue that traditional performance appraisal methods an attempts by management to pin the blame for poor organization performance on lower level processes, rather than focusing attention on the system, for which upper management is primary responsible.

Should individual performance appraisal be eliminated, as Deming suggests? This is unholy in view of the historical and widespread use of this human resources management tool. More then, can be done to relate individual and group performance to a total quality strategy?

Performance appraisals are most effective when they focus on the objectives of the company and therefore of the individual or group .Because the eventual outcome of all work is quality and customer satisfaction, if follows appraisal should somehow relate to this outcome - to the activities of the company, the group, and the individual. In other words, a performance appraisal should be aligned with the principle of shared responsibility for quality. This can be accombared by focusing on development of the skills and abilities necessary to perform well and as directly support collective responsibility.

In a model used by Hay Group (a consulting organization), individuals are evaluated for base pay on such variables as ability to communicate, customer focus, and ability to work as a team. Managers are rated on employee development, group productivity, and relation ship. Variable pay for both is

Check your Progress

1. Why humans are efficient in quality process control?

based on what is accomplished. Because customer focus is a critical part of any TQM effort, a three category rating system that involves (1) not meeting customer expectations (2) meeting them, and (3) far exceeding them is easy to implement.

Answering Deming and the other critics is not easy. The integration of total quality and performance appraisal is necessary. One should reinforce the other. One approach might be to modify existing systems in accordance with the following principles:

1. Customer expectations, not the job description, generate the individuals job expectations.
2. Results expectations meet different criteria than management-by-objectives statement.
3. Performance expectations include behavioral skills that make the real difference in achieving quality performance and total customer satisfaction
4. The rating scale reflects actual performance, not a grading curve
5. Employees are active participants in the process, not merely drawn in
6. Regardless of which specific system is adopted, there seems to be little question the performance management practices need to be in the with the and supportive of TQM.

4.3 TRAINING PACKAGE

To use the right TQM soft ware, it is essential to design and implement policy- policy bound education and training packages. To train without ready opportunity for use and experience is not productive. Instead, goal bound education and training which enables.

Gradual transformation from the vertical to horizontal style of management linked to sues that forge with total customer satisfaction, would be highly productive and yield.

Significant results

TQM upgrading is a continuously evolving process. The business problems and issue involved are complex. Mere exposure of the top management to the tools and techniques, through necessary training is not enough. In designing and conducting the awareness programmed, several aspects have to be carefully considered. The main questions to be kept in constant focus in working out the package are as follows.

1. On going status and state of the art of quality management in the company.
2. TQM upgrading help the top in moving towards company goals and mission

It is desirable to have a status survey before conducting the awareness programme. The results would from the basis for formulating specific issues and chalking.

Out a road map for follow -up exercises. This could provide the material for technical session in the awareness programme.

Frequent opinion survey of all persons of the rank of managers and above in the company would bring out issues and improvement projects of a short - term nature. The results would provide the basis for short - term action plan.

Tools techniques and application situations have been categorized depending on the group of individual needs in applications. Form them: a specific menu has to be chosen an suitably packaged in the awareness programmed based on the needs and situational requirements of the company.

Awareness, and likewise other educational and training too should have a liberal case - orientation. Less theory, more concepts, more practice and more case studies and applications should be the guiding principle in the programmes. For top management, more of quality development and improvement would be useful.

The training package and timing is issue - based until the chronic problems are solved to satisfactory levels. The composition may very thereafter to secure the improvement objective as a continuing process.

The training also focuses on the long term TQM policy objective. The task performance as the job owner and quality controller seeks transformation of responsibility to reach the superior job activities.

The top management program me must preferably be led by senior professionals with vast experience in the nature of business problems and TQM implementation interfaces.

For the middle management and supervisory level the package might include a mix topics together with liberal application aspects on TQM policy issues, implementation mechanisms, for mention of quality improvement teams (QITs).training, reviews etc.

The IIC is an admirable forum to map out a schedule bound education

and training package focusing on the project. its purpose and targets.

Workers' trading is yet another important area. The focus topics, target groups and points of use etc., all having to be worked out as detailed exercises begin in the first phrase of upgrading.

TRAINING QUESTIONNAIRE - 1

1. Customer percepuon
   - We have always had satisfied customers.
   - We have had some dissatisfied customers, but their number and that of complaints are not high.
   - We have dissatisfied customers but their number and their complaints vary largely from time to time and product to product.
   - I do not have any idea
2. IMAGE BUILDING
   - We can improve out market and image by the following
   - More effective advertising
   - More effective after-sales service
   - Timely deliveries and supplies.
   - Timely commissioning
   - Preventive service failures.
   - More efficient inspections and testing at the plant.
   - Closer contact with customers.
   - There is not much scope for improvement.
3. Customer Service:
   - In my view, customer quality and service is affected because of the following
   - Too much rush and push on meeting the production target.
   - Lack of completeness and clarity of the drawing and customer requirements resulting in delays, doubts and reworks.
   - Lack of sufficient commitment on the part of work-force.
   - Lack of sufficient supervision.
   - Material shortages.
   - Lack of sustained concern by the upper management.
   - Inspection and quality control is skipped or in adequate.

- I donot know enough of the situation

SOME IMPROVEMENTS

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- To produce products are as per the specifications, the attention given in manufacturing at present.
- Is satisfactory
- Is far from satisfactory
- If attention is far from satisfactory, it is because of
- Pressure to meet quality targets in the shops.
- Lack of proper tools and materials
- Lack of sufficient operative care and skills.
- Unsatisfactory materials from earlier operations
- Insufficient inspections service.
- Lack of quality training for the work - force.
- Lack of adequate concern by the upper management
- Other reasons (mention briefly)

Improvement exercises (if improvement exercises are taken up, priority should be given to the following):

In - plant:

- Reduction of snags or defects
- Non performance in complaints
- Sub standard bought - out materials or suppliers.
- Elimination of delays in inspections and testing.
- Training and upgrading of operative skills.
- More effective communication on shop problems and solutions.
- More effective communication between supervision and workers.
- More effective reporting and evaluation of performance.
- Upgrading technology or knowhow at select stages.
- Others (mention briefly)

Field aspects

- Cut down failures and breakdowns.
- Improve customer relations.

- Prompt commissioning.
- Improved after - sale service.
- Others (mention briefly)

6. Quality Improvement

Do you agree that by improving quality at various stages, throughput will also increase?

Yes No

7. Most important areas needing improvement. What in your view are the two most important areas where efforts spent will soon bring about the largest benefits in improving quality and throughput in the organization? Be brief

APPLICATION

Total Quality Management (TQM) is an essential and a process focused on the customer, aims at improvement of all the activities and operations of a company. The business environment is constantly changing. The requirements of the present and potential customers are also undergoing changes. To stay close to customers is essential for continuity of business competitive processes require constant review and strengthening. Customer-driven, Employees centered and sytem-based TQM is a universal link to aid this exercise.

A structured approach to the TQM policy formulation and implementation is highly desirable. An approach put to work is recalled in this part. It is derived from the actual experiences in a few large corporations having multi-project,multi-location, domestic and export business operation in a wide range of products including complex, high technology manufacture.

Typically, business in these corporations are conducted on three tiers. The corporate head quarters is the first tier. It consists of the CEO (Chairman who prsides over the board and is in the overall charge of the corporation) and the heads of various functions(called presidents) who broadly oversee and coordinate the business affairs of the company. The business Groups(BGs) the nodal centres, are the second tier. The coordinate various manufacturing, marketing and the other operational activities in the Group in respect of the products which are near homogeneous in terms of manufacturing and marketing expertise. The BG heads (presidents/Executive Directors) have General Managers (GMs) /Joint General Managers (JGMs) Chief of operation at the manufacturing units, marketing service and other activity centers. The BGs are

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the profit centres for the kind of products they manufacture and sell. The manufacturing and marketing, the service and the operationsl units that report to the BG, constitute the third tier of the corporate business (In medium and small businesses, the third tier might itself be a holistic structure of business combining the features of the other two tiers. In developing economics, business in typically carried out in this fashion)

Problems of interface are not, uncommon in large corporation with a complex structure TQM aims at improving the effectiveness of business processes that follow horizontally while the corporate function and the tiers that have vertical integration would frequently impair effective implementation, review and updating of the systems and procedures that are vital links for the expeditious fulfilment of customer requirements and expectations. In such situation TQM starts with appraisal and diagnostic exercises in order to promote effective interfaces for total implementation. Special precautions, however, have to be exercised against imposition of TQM as a novel experiment without a careful appraisal of the environmental realities of the organization.

Creating supra heavy organization structures for TQM implementation at the corporate head quarters or the BGs is undesirable. Conceptually, TQM is grounded in the principle that the task-performer is the "owner of the activity, whatever his leve, and the objective is to render his task quality-controllable at source. The hierarchy aids the task-performer to become responsive toward continuous improvement. The nodal entity is thus a prepared TQM participant with due environmental support. The corporate or the BG TQM secretariat, rich in expertise, has a role to play as promoter, interpreter and supporter in the organization. The set up has to be small (limited by the number) and expert group with a clear mission to secure effective TQM implementation, causing periodic review and further continuous improvement.s

MANNUAL

In business without corporate structure the guidelines described under the business group or the unit as appropriate might still be applicable in parts. These provisions do not replace the customary quality manuals' that companies may have to guide their in company inspection or quality control operations.

An effective implementation of the corporate TQM policy aimed at total customer satisfaction is the basic purpose of the manual.

FRAME WORK

The policy and the guidelines are based on the following broad frame work:

1. Customer is the main focus white total customer satisfaction is the key corporate objective.
2. Zero - defect or Zero non - conformance the corporate operational policy advancing the state of the art the associate vital goal.
3. Congruence from the CEO down to the bottom line, complete congruence of corporate TQM policy, goal target, linked to customer.
4. Target objectiveness: quality, delivery and cost linked to customer requirements/exemptions.
5. Scope: Whole business/process system. sub - optimal pursuits.
6. Device: improvement process.
7. TQM promotion: compact (by number), highly competent, motivated secretariats established at the corporate and the BG headquarters.
8. Issue - based improvements: Specific performance target levels linked to policy implementation (issues - warranty liabilities, performance losses etc..) target developed and implement structure, goals and time schedules determined.
9. Constant: review action to achieve improvements and correct policy distortions
10. Task performer: the owner, quality controller:QA:promoter,service agent.TQM ability, implementation coordinator and charge agent;QC inspection and testing: deemed agent of the customers, troubleshooter.
11. Education and trading: relevant purposeful, goal - bound, improvement - driven, and substance - oriented.
12. Improvement after improvemei core pursuit of the corporation, people centered remember driven.

POLICY

The TQM policy of the company shall be to:

1. Consistently provide products and services that meet the requirements of customers.
2. Actively advance the state of the art of products, systems and services that meet the emerging expectations of customers in the growing competitive environment.

In the first part, the policy refers to the "requirements" of customers. Requirements refer to quality in all respects including appearance and performance, such as reliability, availability, serviceability and trouble free functioning of the products and systems at a the user's end.

"Consistently provide products and services "would mean not only the "right" produce and services first time, but also make them available "right" at all times to customers as per their requirements.

"Meet the requirements "would imply that the products and services would have to be "defect-free" or free from "non-conformance". This means rejection of the common standard practice of accepting products and services as per acceptable

Quality levels (AQLs) which would permit a certain percentage of defects or non-conformance in the products/processes.

The AQLs would serve as formalized barriers/discentives to TQM improvement exercises. Zero non-conformance or zero defects would mean that an immediate alert should be raised upon detection of non-conformance/defect for its prevention.

"Requirements "would also imply comprehensive assessment of the application and the other need expressed or implied by the individual customers, as appropriate, it secure effective performance of the product/system in its actual "usage environment".

"Requirements "would also include delivery and acceptable cost, in terms of making available the product(s) service(s) spares, etc. as per committed schedules and estimates.

In the second part of the policy, the implication is for the company to keep abreast of the competitors products and technology. The development thrust includes:

(i) Foreseeing the market trend

(ii) Undertaking development exercises to fulfil the expressely stated stated or implied needs of our customers;

(iii) Creating newer cost-effective market leadership by warranty or other premia, and

(iv) Well researched product or system advancement and applications for customers, etc.

The two parts of the policy firmly implemented would virtually guaran-

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tee customer satisfaction. The corporate management belives that the toal quality improvement programme must be based on the preventing errors and mistakes before the occur rather than solving the problems in retrospect. TQM is grounded in the principle of prevention of non-conformance and processes of continuous improvement.

A key element in the policy implementation process is the educational thrust to instill in the where hierarchy a keen awareness of the importance of supplying to customers state of the art effects - free products, systems or services as per their requirements, and or time.

The question arises whether the Zero - defect" policy in products and services based on the current state of the art could retard the company's growth. However highly pitched, the policy and intensions must be capable of being implemented effectively and achieving results to benefit the customers as wells the company. Building on careful assessment on the ground realities. The state - of the -art could still be advanced to make the company stride for leadership and sustain growth.

Environment quality is receiving is global attention. Statutory regulations may compel customers/producers to meet the requirements for such societal protection. The customers/producers may have to include such requirements as applicable to the products.

The board must take a policy decision on the timing and time for implementing TQM based the appraisal of prospective benefits. This should be followed up by as assessment of requirements and in-house resources available for implementation. External expertise requirements as necessary especially for transformation of attitudes and manpower development, must also be assessed. It is also important to integrate TQM with ongoing projects, if any for effective implementation.

DEPLOYMENT GUIDELINES

The basic thrust of TQM is an improvement after improvement.Focusseed on customers the TQM approach underpins the need for flexible response to customers needs and requirements.Business processes invariably transcend the functional boundries.They has to have uninterrupted flow to be able to provide flexibility and effectiveness in response. The cross

Functional linkages require constant vigil and effort to foresee and promptly resolve possible blockades that may affect the flow of the processes.

This forms the foundation for the company's TQM policy and can only be implemented by providing for effective administrative and technical coordination and assistance from the members of both the corporate and the BG mamgement.

The onus of the executive responsibility for policy implementation resets on the BGs and their manufacturing .marketing and service managements. As the frontline customer corporate customer satisfaction in tune with the specified corporate mission and vision.

Corporate policies and strategies as set out in the long term perspective plans from time to time, as well as in the annual palns, shall from the basic framework for all the BG operations building product mix, production programmers, competitive strategies and market focus for products, systems and services. Each BG shall have complete and comprehensive strategies responsibility for the effective implementation of the TQM policy, goals, plans and programmers with in the overall frame work of the corporate guidelines

The aim of the company is total customer satisfaction. To secure this, it is necessary that people be prepared for active participation. For the purpose, the BG executive head (President) and his management team shall be responsible, among other things, for the following.

1. communicating the TQM policy to every employee in the BG
2. Effectively implementing the corporate TQM guidelines as described in theTQM manual by control and deployment measures in the BG hierarchy so as to achieve across the board congruence of understanding and efforts of employees with the corporate policy and goals.
3. Formulating (wherever necessary), specifying and documenting clear, unambiguous quality standard and customer requirements as applicable, these standards shall include performance. Aesthetic, functional and other such customer requirements.
4. Pro-active planning in every area in the BG to provide products and services that comply with the quality, delivery schedule and cost objectives applicable to the products and services.
5. Formulating specific short-term annual and long-term performance improvements targets and goals that affect(customers improvement targets may cover aspects such as fields complains and claims, warranty

returns, delays, non-conformance in deliveries, servicing, commissioning, prompt supply of spares, and internal losses such as wastes, r works, downgrades, delays, non-conformances in the committed ord deliveries (CODs),etc).

6. Identifying the prioritizing specific short-term and long-term thrust a eas that have a direct bearing on customer requirements /satisfactio and organizing continuous improvements on them to reach target lev els.
7. Monitoring and continually improving the level of customer satisfac tion.
8. Developing quality plans both for new products and the existing stea of product s with the business partners (this task has special priority i export jobs)
9. Developing joint quality and delivery implementation measures and pla with suppliers as necessary supplement to the total system along th whole supply chain of products and services to customers.
10. Clarifying and specifying managerial responsibility for fluffing the targ expectations of customers.
11. Coordinating reviewing and deploying the budgeted funding for goa bound improvement programmers and implement ion of long term con trol and compliance measures in keeping with the company policy
12. Providing education and training in the improvement processes to achieve customer satisfaction objectives.

4.4 QUALITY FOCUS:

The BG quality headquarters(HQ) under the CGM (or GM) shall provide coordination and technical secretariat services in the quality matters relating to the following.

1. The formulation and specification of quality standards for boty.products on-stream and for new ones.
2. Dispositioning of the deviations or concessions in the acceptance norms of products.
3. Improvement exercises.
4. Implementation of the TQM guidelines.

The BG quality coordinator (a person of at least the JGM rank) shall

assist the GGM or GM (improvement implementation) in all matters concerning corporate policy implementation in the manufacturing and the other departments of the BG including the following:

1. Shall audit the system. procedures, products.processes.gauges, instruments, etc, at the constituent units/departments of the BG and activiely follow up the implementation of the audit findings.
2. Shall prepare monthly progress reports and submit them to the BG head with copies to the GGM/GM (improvemtn) and the corporate management.
3. Shall actively coordinate with the corporate TQM secretariat in securing effective implementation of the quality polices, plans,programmes, and with the BG, R&D,design and development, marketing, servicing, purchase vendors, etc. in the formulation review, revision of quality standards and their communication and implementation at the manufacturing units.
4. For new products especially shall prepare quality plans in partnership with the concerned specialist groups for which standing committees might be set up by the BG head as and when necessary.
5. Shall also coordinate implementation of the educationsl and training programmes designed for quality improvement and assurance in the constituent units.

NOTES

Check your Progress

2. What are the reasons for performance appraisal?

4.5 MANUFACTURING AND TQM

The unit head (GM of equivalent) shall assume the overall leadership of implementing the TQM policy and programmes applicable to his area of operations. He shall promote improvement processes in every area at each level of work-force taking in to account the BG and corporate guidelines and policy frame work.

He shall have detailed exercises carried out linking up specific improvement tasks and the BG goals, and targets with respect to customer driven aspects such as complaints and claims warranty returns, field losses relating to unreliability, unavailability and other customer dissatisfaction factors, as well as in - factory non-conformances affecting the delivery; quality and profitability parameters of the company such as defect -rates, delays, down time/blockages in production quality and cost of products; Prioritiating and organizing improvement exercises would be his and his team's responsibility.. To the ex-

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tent the specialized inspection and test services are sought and utilizes such as for ultrasonic, metallurgical evaluation, sophisticated gauges and instruments and such other laboratory equipment or specialist services the user department agency shall pay for the services as per the assessed tariff, such services shall not, however dilute or replace the basic accountability of the user department agency for the defection non conformance prevention.

6. As deemed representative of the external customers, the quality control shall implement in house on line safeguards, in terms of the hold poits or witness stages in order of prevent compounding of potential defects of non conformances that may pose difficulties or hazards in detection, correction and timely feedback for prevention. Such inspection and testing in house at planed workstations is also necessary from the economic standpoint of company by detecting non conformance sooner rather than later thereby preventing uneconomical value addition on questionable products by further processing operation.

7. Quality control shall effectively assist the internal customers in their detect-prevention programmes. The nature of such assistance shall include the Plan. Do. check and Act (PDCA) cycle as many times as necessary until the error free defect free sate is reached.

8. Quality control shall have a quality date bank on defects. non conformances. test parameter result and all items affecting the customer in terms of quality losses internal and extremely. The data shall be regularly evaluated and the results communicated for effectives achieving the defect free status and for providing the much needed base for potential quality development and productivity improvement.

9. As deemed reprehensive Quality control is vested with responsibility to accept products systems as per approved, documented standards, It shall, however, not have authorized to condone conformances whatever their origin Non-conformances shall be dispositoioned by dispositional by duly authorized standing committee consisting of nominated representative form the BG.Design, R&D.QA.Qc and the designated manufacturing marketing nominee.

10. If there is lack of clarity in the standards, of standards are absent for productive in the on going stream, Quality control shall remit the matter to BG Quality Coordinator (convention of the standing committee for expeditious decisions.

4.6 QUALITY COMMITTEE

There shall be a TQM committee with the BG head as its chairman and the unit GMS and the other Divisional Chief as members. The chairman may co-opt more members as deems fit. The GGM,gm (TQM coordination)shall be is member secretary.

The function of the committee are as follows:

1. To promote implementation of the corporate TQM policies, programmer and thrust areas.
2. To consider the annual improvement plans, targets, policy deployments, and work programmers' of the various untils divisions and approve them.
3. To review the progress of implementation.
4. To arrange the formulation of budgets, the annual and long-term rolling TQM plans and to approve the budgets for submission to the corporate management.
5. To consider the monthly unit. division (marketing included)reports on customer claims. returns and other field losses, as well as the internal quality reports of the manufacturing units and to provide guidelines for effective controls.
6. To suggest any other measures for realizing the policy intentions of the company.

4.7 CORPORATE TQM

The corporate TQM shall be headed by a president. He shall report to the CEO of the company. His functions would be as follows.

1. To design quality polices as applicable to different BGs (product groups) and submit them for approved to the CEO
2. To prepare guidelines for effective implementation by the BGs and the constituent units divisions.
3. To coordinate with all the operational entities (the corporate directorates. the BGs. units, service sectors market and field activities including customers. suppliers etc) in all aspects concerning total customer satisfaction of the existing products, systems, services, new produces etc.
4. To promote and assist in the company wide implementation of TQM and related company polices and programmers.

5. To formulates the long term (three to five years) and the annual TQM plans, programmes, etc. covering the existing stream of products and new ones, export products and systems, development of products and technologies and submit them along with the corporate budget plans and programmes for consideration and approval
6. To plan prepare and assist in the company wide corporate quality audit by the CEO, and himself conduct audits as per specific plans and schedules, particularly to appraise the status and effectiveness of implementation, of the TQM polices and programmes at the business operation centers activity levels.
7. To review to the TQM policy implementation, and evaluate the progress in terms of customer driven results and company targets, goals, profitability and the other applicable performance criteria.
8. To actively participate in the BG, unit and corporate review meetings and committee deliberations and promote practical measures for policy control and implementation in all areas.
9. To prepare plans, programmes and schedules for company wide TQM education and training and arrange for implementing them after due concurrence from the CEO and the President (personnel) and the apex committee.
10. To coordinate and liaise with all outside statutory agencies, international organizations, code-making associates such as ASME, ,etc. and other national bodies in all quality matters to promote the interests of the company.
11. To prepare and submit to the CEO and apex committee, quarterly reports on the status of TQM in a perform prescribed for the purpose (he may also submit other periodic reports and notes to the CEO on special projects, schemes and studies as and when necessary.
12. To serve as member-secretary of the apex body for quality and carry out all activities and follow-up as entrusted to him by the CEO and the apex body of the company.

EXECUTIVE, TEAM

The President(TQM) shall be assisted by a compact and competent executive team at the corporate TQM headquarters. The executive team shall have a at least GM rank (preferably GGM) to provide the day-to-day executive follow up and coordination services with the BGs, varcus corporate bodies and business entities all over the company.

The GM (or GGM) at the corporate secretariat functioning under the President (TQM) shall be responsible for the daily management activites of the TQM secretariat. He and his team of four to five senior staff executives shall have the following responsibilities.

1. Executive coordination with the BGs and its constituent units/division in the effective implementation, follow-up. review. appraisal and evaluation of the TQM policies. programmes and plans of the corporate management
2. Co-participation (with the President. TQM) at the BG TQM committee and IIC at the units in the review and implementation appraisals:
3. Technical guidance to the BG. the Unit QA and QC in various activities assigned to them.
4. Active participation an follow-up in the various standing committees of the BG and the corporate management in the preparation of quality plans. audit manuals. formulation. review and documentation of quality standards for on-line as well as new products. exports products supplier items. ancillary and bought-out items and materials.
5. Assisting the TQM President in the audits with particular reference to preshipment of TQM quality contracts.
6. Design and active participation in supplier quality development and implementation of TQM quality contracts.
7. Close participation in the field quality monitoring customer survey and appraisal activities.
8. Participation in the programming and scheduling of the company wide quality education and training.
9. Assisting in President (TQM) in liaison and coordination with the various national and international agencies and institutions.
10. promoting the TQM approach throughout the company.
11. Bringing out a bi-monthly newsletter. arranging dissemination and abstract services as necessary aids.
12. Technical assistance to R&D. design technology.marketing. production and engineering in quality development productivity improvement and cost reduction projects.

APEX COMMITTEE

There shall be a corporate apex committee with the CEO as its chair-

man and corporate functional presidents and BG heads as members. The president (TQM) will be the member secretary. The chairman may co-opt more members as necessary. The apex committee shall meet at least thrice a year.

The function of committee would be as follows:

1. To lay down company TQM polices and guidelines.
2. To formulate and specify the company wide annual ad long term thrust areas and objectives.
3. To review the progress of implementations.
4. To consider and approve the corporate and BG(TQM) budgets,plans programmes manning, training and other schemes aimed at fulfilling the overall policy intentions and results.
5. To recognize outstanding performances in achieveing the company objectives and decide on awards, shelds, prizes or other recognitions from the company.
6. To consider any other TQM matters for the promotion of company objects and interests.

The CEO shall lead conduct every six months, a company wide top management audit of the systems, procedures and implementations to take stock of the situation and point out distortions. If any in the TQMpolicy control and deployment measures. Such an exercise by its nature will focus on system deficiencies and managerial actions necessary for achieving total customer satisfaction profitability as well as the company growth objectives.

The CEO shall keep the boadrd and the stock-holders informed of the TQM programmes implemented and their impact, with particular reference to customers, growth, returns on investment and other such parameters.'

The CEO may set-up expert working groups of commission expert (s) for overall evaluation, audit, appraisal, promotion, guidance monitoring, review or other such purpose as the deems fit to secure company-wide TQM implemention and its upgrading, form to time.

OPERATIONS

1. To design qualify polices as applicable to different BG(product groups) and submit them for approval to the CEO

To prepare guidelines for effective implementation by the BGs and the constituent units divisions

2. To coordinate with all the operational entities (corporate directorates,

BGs, units serve sectors, and market and activities, including customers, suppliers, etc.) in all aspects concerning total customer satisfaction of the existing products, systems, services, new prodcts. etc.

3. To promote and assist in the company-wide implementation of TQm and related company polices and programmers.
4. To formulate long-range (three to five years) and annual TQM plans and programmes covering the existing stream and new products. export products and systems, development of products and technologies, and submit them along with the corporate budget plans and programmes for consideration and approval.
5. To Plan, prepare and assist, in the company-wide corporate quality audit by the CEO, and himself conduct audit as per the specific plans and schedules, particularly to appraise the status and effectiveness of implementation of the TQM polices and programmers at the business operation centers/activity levels
6. To review the TQM policy implementation and evaluates the progress in terms of customer-driven results and company targets, goals, profitability and other applicable performance criteria.
7. To actively participate in the BG, unit and corporate review meeting and committee deliberations, and promote practical measures for policy contral implementation in the all the constituent areas.
8. To prepare plans, programmed and schedules for company-wide TQM education and training and arrange for implementation them after due concurrence from the CEO, the director(personnel) and the apex committee.
9. To coordinate and liaise with all the statutory agencies, organizations, code-giving association and international bodies and societies such as, etc in all quality matters which would promote the interests of the company.
10. To prepare and submit to the CEO and the apex committee quarterly reports on the status of TQM in a Performa prescribed for the purpose. (H me also submit other periodic reports, notes, etc. to the CEO on special projects, schemes, studies etc. as and when necessary
11. To serve as members secretary to the apex body for quality, and carry out all activities as are entrusted to him by the CEO and the apex body

of the company.

12. Executive coordination with the BGs and their constituent units/divison in the effective implementation, follow-up, review, appraisal and evaluation on the TQM polices programmes and plans of the corporate management.
13. Co-participation with the president (TQM) at the BG TQM committee and the unit in -charges in the review and implementation appraisals.
14. Providing technical guidance to the BG and the unit QA and QC in the various activities assigned to them15.
15. Active participation and follow up in various standing committees of the BG and the corporate management in the preparation of quality plains, audit manugal,s formulations, review, and documentation, of quality standards for on-line as well as new products, export products, supplier items, ancillary and bought out items and materials.
16. 16.Assisting the president (TQM) in the audits with particular refrence to pre-shipment export products.
17. Designing the actively participating in the supplier quality development and implementation of TQM quality contracts.18.
18. Closely participating in the field quality monitoring customer survey and appraisa activities.19.
19. Participating in the programming and scheduling company wide quality education and training.
20. Assisting the president(TQM) in the liaison and coordination activities with the various national and international agencies and institutions.
21. Promoting the TQM approach throughout the company.
22. Bringing out a bi-monthly quality news letters and arranign dissemination and abstract service as necessary aids.
23. Extending technical assistance to T&d, design,technology, marketing,production and engineering in quality development, productivity improvement and cost-reduction projects.

The president (TQM) shall finalize the manning the placement levels of the executives of the TQM secretanat, in consultation with the presiden(personnel) and the undersigned.

He will also arrange for necessary orientation and expertise to the TQM secretariat saff, keeping in view the broad guidelines given in the TQM manual.

to enable them to provide effective and promote coordination with the various business operation in the company.

4.8 TQM SECRETARIAT FUNCTIONS.

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1. Communicating the company TQM policy to every employee in the BG.
2. Effectively implementing the corporate TQM gudielines as prescribed in themanual by such control and deployment measures in the BG hierarchy as to achieve universal congruence of undersanding and efforts of out employees with the corporate policy and goals.
3. Formulating (wherever necessary),specifying and documenting clear, unambiguous quality standards and customer requirements as applicable (such standard shll include performance functional and other requirements of customers)
4. Pro-active planning in every area in the BG to provide products and services that comply with the quality, delivery schedule and cost objectives.
5. Froumulating specific short-term(annaual) and long-term performance improvements targets and goals that affect customers, (such improvement targets any cover aspects such as field complaints and claims, warranty returns, delays, non-conformances in deliveries, serviceing, comminssioning, prompt supply of spares, and internal losses such as wastes, reworks, down grades, delays, non-conformances in the omitted order deliveries (COD s0,etc.)
6. Identifying and prioritizing specific short and long term thrust areas that have bearing on customer requirements and satisfaction, and organizing continuous improvements in them to target levels.
7. Monitoring and continually improving the level of customer satisfaction.
8. Developing quality plans both for new products and the existing stream of products with business partners(with special priority for expect jobs)
9. Developing joint quality delivery and implementation measures and plans with the suppliers as a necessary supplement to the total system along the whole supply chain of products and services to our customers.
10. Clarifying and specifying managerial responsibility for fulfilling the target expectations of our customers.

Check your Progress

3. What are the activities taken as a part of in-plant quality maintenance?

11. coordinating, reviewing the deploying the budgeted funding for goal-bound improvement programmes and implementation of long-term policy control and compliance measures and

    Providing education and training in the improvement processes to achieve the customer satisfaction objectives.

13. TQM rolling and annual plans

4.8.1 TQM EXECUTIVE TEAM FUNCTIONS

1. The BG executive head shall formulate a long-term (three to five years) rolling plan and short-term annual plan on policy implementation and deployment measures. The plan should include customer satisfaction improvement projects as applicable within the corporate policy frame work. Specific description should also be given of priorities and thrust areas, target levels, budget and manning, and specific benefits/results in the direction of customer satisfaction and profitability to the company

2. The BG head shall submit such rolling and annual plans as part of the companys annual plan review and approved by the corporate management

3. The BG head shall have a group general manager or GM, by rank as apprpropriate who shall have exclusive responsibility at the BG headquarters for TQM coordination and coporate policy implementation. His specific duties would be as follows.

4. Assisting the BG executive head in securing effective implementation of the policy and provisions in the corporate TQM policy document.

Preparing quarterly progress report on the status of implementation of the provisions in the manual for the BG head with copies to the corporate management.

Assisting the unit GMs and the agencies involved all long the manufacturing lines of our products, systems and services with the specific objective of improvements aimed at customers and satisfaction.

Exceeding effective coordination and providing necessary technical assistance for marketing, subcontractors and ancillaries, involved in customer satisfaction exercise.

Participating in the target setting exercises at the manufacturing unit, supplier items,ancillaries,marketing,service,engineering development's design, and the other functions/departments ,in respect of error - free performances and

customer - driven improvement parammers,and communicating them to the concerned authorities including the executive head ,members of the BG quality committee, corporate management ,etc.,

Arrange technical and organizational assistance and expertise as applicable for securing targeted improvement objectives to the units and other agencies concerned.

Monitoring and coordinating improvement projects and activities and preparing reports in the prescribed format for the BGhead, with copies to the members of the BG quality committee and the corporate management.

Actively participating in the unit IIc, meetings, and in the improvement project activities concerning the policy goals of the company and the BG.

Arranging as the member - secretary of the BG quality committee.

Function as the member - secretary of the BG quality committee.

The president (BG) shall take all necessary actions including issuing office orders. work allocations and instructions.etc.. for the effective implementation of TQM policy and the provisions specified in the manual in all the constituent units.sections,etc., in the BG under his control.

He Will also assign the manning. placement levels etc.. as per the details in the manual construction with the president (personnel) the president (finance) and the president (TQM)

He will also report on the progress of implementation as per the provisions in the manual.

4.9 TEAM EXECTION CHECK LIST

Promote improvement processes

1. Arrange to get complete list of specific improvement studies linked to customer complaints,clamis warranty. field losses. Availability (down-time of machines),reliability (spare car breakdown ,preventive).delays in servicing - production rate, deliveries in terms of right product. right place. and right time, service quality,etc..defect rates, on conformances delivery
2. Committed order Delivery (COD). reworks. blockades (process). blockades(bought-Out), cost wastes. rejects/non conformances. high work in progress(process wise)
3. Assess prioritities for the studies as per item 1 above (the criteria for

prioritizing) shall be laid down in writing.

4. Prospect for target-fixing and deployment strategies relative to owner Areas. (This involves detailed exercises to locate the potential sources of defect, non-conformances .etc. and fixing sub targets and designinating the area owners for studies, prevention/remedial measures etc.
5. Monitor the progress by visits, discussion, etc., at improvement study sites.
6. Communicate the TQM policy and the improvement goal envisaged Actions.
   1. Issue circular/notice to reach various levels.
   2. Address meetings and discussion forums for the purpose.
   3. Print circulate and display posters, slogans, etc. for promoting improvement driver exercises.
   4. Organize competitions.
   5. Motivate by appropriate measures executive / intensive policy implementation to the bottom line.
   6. Organize customers site visits by production / design/quality groups on prioritized defect prone improvement problems.
   7. Implement recognition measures for meritorious work by the team and member
   8. Arrange to have a plan and time schedule drawn up for the transformation of responsibility for inspection and test from QC to respective work area Managers.
   9. Monitor and follow up the transformation of inter or intra department improvement projects and responsibilities of managers reporting hime.
   10. The corporate TQM secretariat will prepare Gantt charts for the checklit itesm. Giving schedules for implementation, monitoring and reporting. Copies of the charts will be sent to the CEO and the corporate and BG heads.
   11. At the BG head quarters and in the untis, half day familiarization seminars will be separately conducted in which all persons of the rank of manager and above at the respective location will participate. The seminars will provide expository notes, on the intentions, scope and implications of the TQM operations. If necessary, follow

up re-union meetings may be held to discuss or amplify specific provisions in the manugal.

12. TQM rejuvenates corporate activities to serve customers better; consequently, the company grows and keep reaching newver heights. The unions have a vital roll in this.

Common endeavour. The TQM policy implications and

13. The BG TQM headquarters will arrange for issue of office orders by the concerned BGs in which the provisions requiring implementation and follow - up by the unit chiefs, including the setting up of the improvement implementation committees (IICs),will be referenced.
14. The corporate.BG and unit QA/QCsecretarials will thereafter closely follow - up and coordinate the implementation of the provisions in the TQM manual and checklists derived for action by the activities.
15. Education, training and other orientation programmers will be scheduled as per details given in the manual.
16. The progress in implementation will be reported by the coordinating TQM secretes to the BG and the corporate headquarters as per guidelines given in the manual.

4.10 TQM IN TINY INDUSTRIES

Small plants and operations are no exceptions to TQM implementation Typically, the plant have a proprietary style of management with one (usually the owner - director - CEO) or two executives at the apex and no structured cards of management and work force.Invariably,TQM in such situations has achieved significant results. Customer satisfaction is more vocally and visibly expressed. Repeat orders from the same customers are quite common, Quality, delivery and price have found mutually acceptable levels between the supplier(s) and buyer(S).

Communications. person - to - person contacts, feedbacks and action to correct distorfonts and improvement efforts have all been for more direct and simple when compared to the experience of larger organizations.Documention and paperwork have been minimal, To the extent that accreditation or qualification requirements are compelling from the buyers, the man agreement have created and maintained the system and paperwork to the satisfaction of the buyers and their authorized representatives.

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In the absence of heavy organizational structures, responsibility assignments are less normal but more visible n the actual operations. Response to continuous improvements has been more spontaneous and in a few small units, it has become a way of life. In the case of firms who have been suppliers to large companies, the approach employed to improvement TQM is similar to that subscribed in policy promotions. The provisions described in the policy development manual generally applicable to the unit - level operations.

APPRAISAL SURVEY

1. Undertake customer quality evaluation and surveys.
2. Formulate realistic specification for the final acceptance of products by harmonizing processes capabilities, test variations, analytical errors, customer requirements and the competitative products in the market.
3. Institute efficient system of feedback from the market for effecting improvements.
4. Organize in - plant systems.
5. Institute statistical process control (SPC) and audit.
6. Undertake yield - improvement studies.
7. Evaluate, improve and control the raw materials.
8. Rationalize the sampling and checking system.
9. Cut costs wastes with special reference standardizing sizes, lengths,packing and utilization of expensive materials.
10. Import quality control and improvement training and education to the employees.

4.11 RECONSTITUTION OF SYSTEM

1. System Deficiencies

The report formats shall insist upon by the chairman to put stress on the CEO and the operating management. Providing prompt and authenticated data without distortions of source poses practical difficulties. The kind of structured data in the formats do not exist, and it has to be frequently generated. The situation compels the hierarchy to tie up number of loose ends. In the process, many inconsistencies will be brought up, For instance, the procedures employed to account for returns from customers and rejections or scrap suffers from basic weaknesses.

2. System of Accounting Returns

Whenever a customer complaints about the material sold to him. The goods are usually replaced in order to maintain the good will of the customers with or without insistence on the return of the defective goods.invariablty for such replacements 'a' 'no value invoice used to be prepared. No credit is issued for the defective material and a fresh invoice is raised for the goods material supplied in lieu of the defectives. In most of the cases the defective goods are returned by the customers. But in respect of one of the products is not returned by the customer and replacements used to be effected based on a destruction certificate issued by the customer. It is not through worthwhile to get the materials back to the factory and sold instead after getting competitive quotations However, taking into account the large number of defective goods returned by the live customers and the deficiencies observed in the procedure a revised procedure for accounting is to be subsequently issued. The system of issue of credit notes by the customers is to be insisted upon.

3. System of Accounting Rejections and Scrap

1. Quality control accounts scrap on the basis of products delivered to stores in a month.
2. Production planning and control (PPC) works out scrap on the basis of the reported inputand output of each department and then pools the inputs and outputs of all departments to arrive at the total scrap.
3. CBC section works out scrap on the basis of input. output and in - process stocks held in each department for the month then pools it for all the departments.
4. Department BC reckons scrap on the basis of (linear) length whereas other departments calculated it on the basis of the number of production units based on area.

We have to give positive guidelines to relieve stress on the daily management. We have to extend policy support to R&D and production to lead them to meet the targets, schedules and expenditure stipulations. We have to put an end of the uncertaintiy.At the same time; we have to drive home the need for confident ownership and accountability at different levels of management for improvement in performance.

4.12 CAUSE ANALYSIS

Causes for Wide Variation Production and High Rejections.

Lack of consistency in production Reported Completes from the markets had promoted frequent meddling with the process conditions.

Accountability of QC, R&D and Others

It is difficult to establish clear accountability for the variations in production and excessive scrap from period to period. Some of the changes made are approved by the plant. There is noticeable anxiety on the part of each department to pin - point sources other than its own for various troubles.

Grading Standards

The two grades of products accounted for the bulk production. one of the grades had received appreciation from the market. A basic problem however prevailed in regard to the reliability of specifications of the grades. The specific task group must formulate detailed grade specifications for adoption by the factory.

Test Methods to Assess Shelf -life

No correspondence had been established between the test result at the factory and the shelf behavior of the product under the varying conditions of stacking, storing and handling by customers. It was imperative to develop rapid test method of correspond to field use and enable production to proceed with defect - free production,QC,R&D and marketing were to complete task urgently.

Indigenous Branding

Once the acceptance comes closer to the domestic market needs and the interactions standards. It is recommended door the indigenous branding. Even as the improvement work starts there is a positive evidence of efforts on a war footing by R&D, quality control and production to track down the compliments and defect - sources. Timely support from an outside quality consultant interesting closely in planning the R&D and production - scale experiments and evaluating the results.

Recommendations

1. Restore fast technology production method and standardize the process control conditions and existed prior to the large scale changes made in the formulations.
2. Improve the shelf - life :(i) R&D, QC and the production department manager to complete the study as a priority (ii) QC, marketing and technical service to standardize the test and acceptance procedures for keeping quality as per actual usage requirements of customers.

3. Avoid ad hoc and panic approach to control of formulation and process, use objective SPC data for actions.
4. Implement the FIFO system for dispatcn with immediate effect.
5. QC (coordinator), marketing, and technical services managers as standing committee to monitor customer requirements and problems continuously and coordinate with proauction manager to prevent defects source.
6. Submit monthly status report to the board.

4.13 CONTINOUS IMPROVEMENT

1. Establish Process Control and Improvement Division.

A process control and improvement division under the CEO should be established to coordinates. Internal rejections and material losses and customer requirements with special reference to application and usage aspects.

2. Strengthen R & D. The initial fours areas should be the following.

   (i) Eliminate production problems by establishing manufacurablly of formulations.

   (ii) Develop new products, technology, process and methods.

   (iii)Develop fast and more reliable testing and inspection methods to correspond to customer usage conditions.

   (iv)Substitute imported materials.

   (v) Research and standardize raw material specifications.

3. Institute Exclusive After - sales Division

An after - sale technical services division should be organized, independent of marketing and with exclusive responsibility to establish work - functions and effectiveness of customers scares and satisfaction, and undertake field application, promotions and training.

4. Enlarge Quality Function

The quality function should be restricted and enlarged to include audit, quality improvement and field coordination and appraisal. It is made responsible for control and given the authorize as per a graded scale, to scarp non - conforming products under intimation to the CEO: and paramedic report to the board in a prescribed Performa.

5. Better Material Management

A senior manager with rich R & D and product experience to be as-

signed to prepare and moment comprehensive and completed updated material specifications. He is also to be associated with task of preparing a list accredited supply at least for the critical materials.

Visual defect picture standards are specially designed. They are promptly followed by all ---------in the dark room.

Prompt tagging to index the defects on the fast conveyors is another operative action taken to and screening at subsequent stages. It saves additional handling, sampling and screening efforts. It helps in maintaining the production flow without interruptions. It also prevents uneconomical value additions at the subsequent processes by trapping the tagged defective portions in the production stream.

4.14 IMPORT SUBSTITUTION

The inter-departmental teams are busy vigorously devoted themselves to improvements and continue to achieve breakthroughs. Quality, production, rejection and material losses has all been put on the improvement track. General performance is encouraging. Just as the phenomenon of improvement got into full swing, news came that one of the critical imported raw material would no longer be available to the company. One of the EEC countries has been the supplier since the very beginning. The material quality was proven over the years. The supplier notified that the manufacturing facility would be shut down and given two months for the company to make alternative arrangements. The news is distressing. The CEO presents the relevant papers at a board meeting and have extensive discussions. Even at the prospect of sliding back (production stoppage is imminent), the board felt that we must develop an indigenous supply. Some of use felt and that this important task had not received due priority earlier.

There was an indigenous firm, but it did not produce the kind of grade we needed. A team is constituted with the R&D managers as the leader and the other production managers, including quality control, as members. The team is given the mandate to resolve the problem an an emergency footing. The Indian supplier extended admirable cooperation. He provided all the facilities requires. He was almost an associate partner in the development mission. An excellent technical support was built between the company and the supplier.

Experiments were carried out in quick succession both at the supplier's end and at the R&D laboratory of the company. In addition to physical and

analytical tests at the factory, performance test-runs were done in the field. Meanwhile, normal production was disrupted to some extent, (There was no separate facility for production trails and experimental runs.) In about four weeks, the commercial viability if the indigenous substitute was established. This was a breakthrough.

The stage was now set for test-marketing at least some of the products. There were -------reactions from some of the bulk-users. Marketing, technical service and quality control------------closer links with the factory team in managing continuous and effective feed-back from the customers. In a short time thereafter, the technical feasibility and saleability was established. The defects were still 10-15% more for the trail market lots. In-processes rejections also showed about 20% higher levels.

An aspect that continued to cause anxiety was the customer report on 'keeping quality' of the products produced from the indigenous substitute. It was known that all the customers wereNot that well equipped to minimize damage in their stock against environmental degradianation hazards due to heat, dust, humidity, storage and handling. The technical service had also been constantly remaining the distributors and the ultimate users that they did not always follow the first - in - first - out (FIFO) system. The overall situation created uncertaintity.Marketing and field service specialists were assigned to conduct an educational and application compaign.The factory's senior managers and marketing and service specialists were the instructors. Special packages of instructions were designed. In the metropolitan constents, distributors and representatives were give in - depth exposure. The importance of preserving built product quality and interfacing it by the right application usage were emphasized.

4.15 TOTAL BUSINESS CYCLE

The test marketing of the product a unique experience in commercializing the product. Starting with the supplier, through the various technological and managerial processes the company to the distributors an ultimate users, the quality management exercise had the be effectively and expeditiously completed in order to make the product to useful to customers .We respect to the applications intended. The logistics involved the total cycle, a master chain in which no links were left out. We continued our vigil. Feedback from the customers to came a way of life. Many potential failures were filtered within the factory, Response from the factory was also prompt.

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A system of audit was put into practice as supplementary safeguard at the dispatch end the factory. Fields audits by technical servicing were instituted. We started monitoring the distributors (ware house) and user socks. We formulated and implemented specifications for storage and preservations. We also instated upon the FIFO system being practiced by the distributors are the users.

The implementation of improvement on the pilot product was completed in about the months. We then ventured in to the health - care products. We successfully, substituted in others a shorter lead time: customer acceptance was also more forthcoming.

The situation was reviewed comprehensively at one of the subsequent meetings on the board. All - round satisfaction was expressed. We recorded our appreciation of the exclusive management's efforts and the positive role played by the supplier as well as the customer in the effective implementation.

In the following year's budget the substituted indigenous material showed significant startings.The year's compliant. Replacements and the process rejection levels showed margin higher levels than in the cost of the products.

The increased complaints and rejections led to renewed improvement exercise. The managers had gained considerable experience in the improvement processes. Significant improvements In the subsequent periods bore testimony to their efforts.

SUPPLIER ASSISTANCE

A notable fall-out of the substitution experience was the launching of similar exercises in respect of some of the important indigenous supplies. In-process stability had always been a source of uncertainty for executives. Counter measures posed a constant dilemma. In process control, it had become clear over a periods of time that whenever the formulations changed, the products characteristics showed significant variations. Statistical analyses had indicated that half a dozen materials, though used in relatively small quantities in individual batches, played a dominant role in upsetting some of the key product characteristics. They were the cause for adverse reactions from the market too.

Our reviews showed that certain raw materials played a crucial role. Some of these (proprietory items) were supplied by reputed manufacturers. Report in the past had not improved the situation. The suppliers were not keen as our purchase was not large enough in business terms. Moreover, the

company's specification were stringent, and the suppliers did not want to give undue attention.

A high-level team was appointed to go into the question. Its items covered broader aspects. namely, how to assure consistency in the quality of the product, relative to materials so as to prevent unexpected, adverse reactions from the customers. The team appraised the facts of the situation. Six of the materials had been identified as critical. For the six materials, background data was complied from the records at the receipt inspection in the company. The exercise brought out many deficiencies in our own system of evaluation. Enough precautions had not been taken in the reliable sampling for solids and liquids from different drums and packets. The tests also were not adequate. Degradation in the stores had been common. The stacking and storing system did not easily permit FIFO to be put into practice. FIFO was not always followed. Handling posed hazards. Documentation of materials used up held in stock and expiry residuals was incomplete.

Implementation of modified procedures of sampling, and evaluation showed large variations from container to container and batch to batch. This led to the practice of blending variable materials at the company. We approached the suppliers and asked them if they could produce and supply the materials in larger batch quantities, without impairing the shelf-life of the materials. We had records on certain defects and excess variations in the past supplies. A simple questionnaire was designed. It was addressed to the chairman/CEO of the supplier companies, including the proprietory item firms. It was followed up by personal visits. The questionnaire and brief specific quality history reports os supplies we had given, provided the agenda for discussions. Specific areas of improvement were jointly pinpointed. We also agreed to provide prompt information on their supplies. We also requested quality reports from them which each shipment of materials supplied to us. In three of the small units, we also agree to participate in the implementation of in-process control programme.

In a year, the supplier quality improvement programme led to tangible results. The proprietory companies showed keen interests in the follow-up and implementations.

EXPORTS

The exercise provided an opportunity for up grading the in-company material quality management. Sweeping changes were made in the receipts

and acceptance producers. sampling. testing, blending, stacking. preservation, coding, issue and stock replenishments of the materials.

The impact was noticeable in the improvement consistency of process quality wastes rejection, delay and savings in sampling and testing. The details of the exercise were documented in a company manual to serve as a reference for common understanding and compliance all over the company.

Marketing stayed closed to the customers. This was a definite advantage to the company. As confidence in the company grew, the customers, especially in the entertainment sector. wanted a differential product mix. This implied a major change in our product manufacture. In some respects, it was a welcome turn. If implemented. it would give us a quantum leap in turnover. As the capacity utilization improved. we saw that a part of the finishing facilities had capacity to spare, By strengthening a part of the balancing machinery, it was possible to meet the customers new expectations. We got permission to import semi-finished stock without much burden to the exchequer. An arrangement was worked to export a part of our production.

One of the EEC countries supplied the raw stock. In return, we arranged to supply the health-care product. This was a maiden experience for us in the export of the particular product.

It was agreed to send a pilot shipment to the buyer. Specifications and pre-shipment inspection were drawn up. Production started in right earnest. The board was kept apparaised of the progress from time to time. This first shipment reached the other country. As per the law of the land. the importing country took samples products from the shipments. The reports showed that the product did not come up to their expectation. The shipement was held up at the port warehouse. This was a major setback to us. Pending deeper investigations, further shipments were suspended.

There was an emergency agenda at a board meeting to discuss the episode. We took the view that the manage (quality control) and the general manager should personally visit the importer and short out the issues. We expressed concern as it was a maiden effort. and it should not spell adverse publicity to our export ambitions. The visit went through as scheduled. The team noted in its report that there were gaps at borth the ends in the matter of complete and comprehensive product specifications, environmental testing and evaluations. and in the actual involved in the acceptance and the actual user institutions for which the products were meant were not one and the same the buyer's end. Evaluation and acceptance procedures dis not match.

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The product failed to meet the full satisfaction of the customers. There had been in completed homework. The board dealt with the subject at some length. I was told to study the issues involved in al aspects and submit a report with specific recommendations to prevent recurrence. Some of the salient points from my report to the board were. From the very beginning. the factory had doubts about keeping the quality of the product. What was essentially a traial production was deemed fit for export. believed to have been produced to the specifications of the customer.

Until half of the consignment was produced. the specification were unclear. There was no document by the importer to support the test programme.the packing and the shipping instructions. nor was it felt by QC that they were necessary as the company. The environment and applications conditions at the usage end were not fully known. There was also no reference to penal ties in the event of non-compliance from either side's early three-fourths of the product shelf life had already expired by the time the shipments reached the customer Based on the sample results from the port warehouse. the customer notified that due to "non-observance of teams of contact concerning quality... further shipments be withheld and the stocks at the port warehouse be held at the cos of the company".

We learnt valuable lesson. "we picked up renewed confindence.More than ever, the need now become clearer to evaluate the customer's requirements from all angles. We made amendments to the expect stock-in-trade. We requested modifications in the application pharse.It entailed me extra investment. There was good cooperation from the importer. We continued to review the operations of the company with a closer focus of markets and customers. Some of the customer parameters remained fixed on the agenda; a few others were dynamic, depending on the emergent issues.

EXPANSION AND DIVERSIFICATION

The stability in the domestic market encouraged us to venture into-expension.Two of the overseas companies had a near monopoly in certain intermediate user-chemicals. It was not directly a high technology product. except in its formulation. The executive management put forward a proposal to the board to take up its manufacture. We had a distinct advantage in marketing, since it was an user - intermediate for our products.

A third manufacturer from abroad with whom we had been in contact

for collaboration for some other products had the know-how for the manufacture of the chemical. We had no difficulty is getting his constant to assist us. He gave know-how and helped us set up the production facility in about a month. The capital on equipment was amall; the raw materials, easily available in the country, accounted for over two-thirds of the cost of the products. The operation was simple. It excludes the changing of the ingredients of known weight and quality in

Container, grinding to them,homogently and discharging the blend after it had attained the quality characteristics.

We were happy that our turnover and profit would show a further upward trend. We had no interstaion in approving the project. It soon went on stream. The product was in the production stream for three months. The quarterly progress report of the operations was placed before the board. The picture we had was disquieting. There was only marginal sale; a few tones of stock - in- maintain were help up; quality was good: customers and test marketing had creditable remarks to share, Yet the product had not been sold.

We learnt at the meeting that the product pricing was not competitive, our price was higher the argument was given at the board that we sell the product at cost as the two competitor aspects of lower price. had already built up customer affinity; it was necessary to overcome the old customer loyalty; to induce buying, parity with the competitors was essential. We could not agree that the we must take our product profitable and comparative in terms of price, especially when searched established quality credentials beyond doubt.

Some of us took the view that it was an issue on which the board should give policy gudielines to the operating management. If we claimed on proven grounds that our product was distinctly superior, we might as well command a premium quality at premium rates. It was reported that the tests at the factory had shown that the productivity per unit of our product in terms of end usage yielded 50 per cent more than the competitive brands. We fall that our product had better built-in value. We debated as to why Marketing had not played an effective, informed role. Despite unsold stocks, some of us at the meeting felt that we might yet became leaders quality-wise, and the customer might appreciate the higher built in value of our product upon trail. We felt our product would decrease the per capita cost of them in end-use.

Meanwhile, a second view emerged. Some members held the view that given the historical background, the time-frame to win over the established

loyalties of customers could be too long. Our project envisaged higher turn-over and quicker profit which was desperately needed at that time. Marketing projected another dimenstion we had not considered before. Except a few, the target-customer group largely consisted of small and medium buyers. They were generally reluctant to go by our claims of superior value and pay more for the product. Most of them were across the-counter buyers. They were reluctant to lock up even small amounts of capital in their daily operations.

We took the view that there should have been more thorough coordinated homework among the marketing, R & D quality control, production and finance before the project was conmmissioned. We also felt that prior the design of the product, the collaborator's technical experts should have been briefed comprehensively on the marketing problems and the product formulation (design) relative to cost and customer buying habits. Access to customers and gaining their loyalty was of paramount importance. The sale ability of the product against competition was foreseen. We decided that it would be prudent to price the product with attendant adjustments in quality levels that would not degrade the user requirements and the same time, prompt the user to buy our products preference to other brands.

The board directed that a review be conducted to arrive at a practical approach for coordinated implementation of this strategy. Meanwhile, as the stocks held had shelf-life, we decided that expeditious measures be taken to at least minimize on this account, adverse impact on the company's finances. The technology documents transferred from the collaborators had given detailed specifications for various raw materials. As the materials had a major share in the product cost, we reconsidered if the product could be producted with a less expensive blend of materials. It implied that the user value in terms of productivity (utlisation effectiveness) might also diminish correspondingly.

The team that would as counterparts to the overseas experts told us that when similar ideas came up during the trails then, the experts took the view that they would stick to finer blends as by according to the contract, our company had the option to brand the product in the collaborator's name, which had global implications for them. The overseas experts argued that given the choice of cheaper blends with which the products were still feasible and marketable, chances were the

4. A continous data-based, customer-driven review and appraisal system was effectively implemented.

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Check your Progress

4. Who are the members of quality committee?

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5. The style of management was restricted to fit the business needs; a new system of accountability was put to work.
6. implement after improvement became a way of life.
7. issue - based purposeful. point of time, orientation and training was imparted through out the plant.
8. The ad hoc panic approach was replaced by planned, systematic company wide process control systems.
9. Date-logging and formats for control, review, report,improvement and follow-up were revised.
10. Effective interdivisional coordination was evolved.

To compare the situation before and after the recovery, a team surveyed the opinions of users on theproducts and services which accounted for nearly 90 percent of the market share. The results showed that the product quality haa reached international standards and no shortages was experienced in the supplies. Deliveries had improved immensely: technical servicing was prompt. The field surveys also gave the company valuable information on the thruse areas for improvement and developemtn in the company. Quality control, marketing and field technical services formulated procedures for repeat surveys to serve the customers and say close to them.

8. "9" CONCEPT

1. SORTING

Arranging or separating and keeping away the unnecessary and excessive items out of the work place.

2. SYSTEMSING

Piecing each and every item inprefixed or preplanned location or place for easy access and use.

3.SWEEPING:

Up-keeping the work place for better environment.

4. SANITISING:

Continuous implementation of Sorting. Systemizing and Sweeping actions to keep the owkr place sanitized.

5. SELF DISCIPLINE:

FOLLOWING work procedure of Work instructions to maintain the Standard work culture at work place.

"place of Work is the Place of Worship"

BENEFITS OF 5 "S"

01. We feel good when the work place is clean and tidy.
02. We can avoid the hassle of searching for things.
03. We can eliminate time wasted in handling
04. We can along without buying unnecessary supplies.
05. We can reduce our defect rate by detecting problems earlier.
06. Our preventive maintenance will be better because equipment inspection will be easier.
07. We can create the amount of machinery downtime and also increase the operate rate.
08. We can create more usable space.
09. Passageways can be kept clear and maintained better.
10. Even small spaces can be used better.
11. We will be able to spot abnormalities just by looking.
12. Good housekeeping will help eliminate accidents and injuries.
13. Improved personal relations and promote a harmonious feeling among people who work together.
14. 5s is something everyone can do together.
15. Total productivity is bound to increase.

4.16 JUST IN TIME (JIT)

JIT Principle helps a management:

1. To minimize the inventory.(stores)
2. To improve the productive efficiency.
3. To reduce the waste.
4. To schedule the preventative maintenance.
5. To reduce the set-up- time.

Application of JIT in minimizing inventory:

The purchase planning can be designed such that a minimum member of components are only orders and kept as inventory on the following basis:

1. Minimum stock level.
2. Ordering and processing period.

3. Delivery schedule.
4. Contingencies.

NOTES

Simple charting is the best example for SPC

SPC is an extremely powerful technique if used properly. Many companies use it for best advantage but too many companies abuse it for the wrong person.

For Example:

1. Case of nobody seeing it.
2. Case of nobody talking any corrective action.

4.17 ROUTE CHART FOR QC PROCESS:

PROBLEM IDENTIFICATION

PROBLEM SELECTION

PROBLEM ANALYSIS

IMPLEMENTATION AND

RECOMMENDATION

TO MANAGEMENT

4.18 ANTECEDENTS OF MODERN QUALITY MANAGEMENT

Quality Control was begun in the factory system after the industrial revolution. Production methods in that time were not followed at best. Products were made from non standardized materials using non standardized methods and the result was products of varying quality. The only real standards used were measures of dimensions, weight and in some instances purity. The most common form of quality control was inspection by the customer. Around the turn of this country. System of scientific management was developed which emphasized productivity at the expense of quality.Centrlized inspection departments were organized to check door quality at the end of the production line.

The control of quality focused on final inspection of the manufactures product and a number of techniques were developed to enhance the inspection process. Most involved visual inspection or testing of the product following manufacture. Methods of statistical quality control and quality assurance were added later. Detecting manufacturing problems was the overriding focus. Top management moved away from the idea of managing to achieve quality control and the concern of limited largely to the shop floor. Traditional quality

control measures were (and still are) designed as defense mechanisms to prevent failure or eliminate defects.

Following World War II. The quality of products produced increased as the manufactured to keep up with the demand for non - military goods that were not produced during the war. It was during this period that a number of pioneers began to advance a methodology of quality.

Control in manufacturing and to develop theories and practical techniques quality. The most visible pioneers were W. Edwards deming. Joseph M. juran. Armand V. Feigenbaum and Philip Crosby. It was a great loss to the quality movement when Deming died in December 1993 at the age of 93.

4.19 ACCELERATING THE OF TQM

The increased acceptance and use of TQM is the result of three major trends:

(1) reaction to increasing domestic and global competition.

(2) the pervasive need to integrate the several organization functions for improvement of total output of thr organization as well as quality of output within each function, and

(3) the acceptance of TQM in avariety of service industries

Aside from existing competitive pressures from Japan and the pacific countries. we are faced with the prospect of increasing competitions from members of the European Economic Community. This concern is justified by the very nature of manufacturing strategy among European firms. where quality has replaced technology as the primary consideration.

Basic to the concept of TQM is the notion that quality is essential in all functions of the business. not just manufacturing. This is justified by the reason of organization synergism: the need to provide quality output to internal as well as external customers and the facilitation of a quality culture of TQM apply quality improvement techniques in almost every area of product development. manufacturing, distribution, administration, and customer's service. Nowhere is the philosophy of "customer is king" more prevalent than in TQM. Customers are both external (including channels) and internal (including staff functions) to the business.

The paradigm of TQM applies to all enterprises, both manufacturing and service, and many companies in manufacturing, service, and information industries have reaped. the benefits. Industries as diverse as telecommunications.

public utilities and health care have applied the principles of TQM. Government agencies and departments have also joined the movements although private sector efforts have been considerably more effective. According to a year 2000 report, 18 percent of the organizations surveyed had kind of TQM effort underway. Productivity and quality improvement programs are expected to be initiated in almost 700 companies 2002

The widespread adoption of one or more concepts or principles of TQM does not mean that results have met expectations. According to the survey. only 13% of employees actively participate in the TQM efforts. Human resource professionals report a strong interest in TQM issues since 1995, ranking employees involvement. customer service and TQM as the top there key issues, yet research shows that initiatives taken by organizations are not receiving as much praise as they did few years ago.

4.20 THE PIONEERS OF TQM

4.20.1 DEMING

Deming the best known "early' pioneers, is credited with popularizing quality control in Japan in the early 1950s.Today he is regarded as a national hero in Japan and the world- famous .Deming prize for Quality. He is best known for a developing a system of statistical Quality control a through his contribution goes substantially beyond those techniques. His philosophy begins with top management but maintains that a company must adopt the fourteen points of his system at all levels. He also believes that quality must be built into the product at all stages in order to achieve a high level of excellenceaned advancing an awareness of the need to improve.

Deming defines quality as a predictable degree of uniformity and dependability, at low costs and suited to the market. Deming teaches that 96 percent of variations have common causes and 4 percent have special causes. He views statistics as a management tool and relies on statistical process control as a means of managing variations in a process. Deming developed what is known as the deeming chain reaction: as quality improves, costs will decrease and productivity will increase. resulting in more jobs, greated market share, and long - term survival. As it is a worker who will untimely produce quality products, Deming stresses worker pride and satisfaction rather than the establishment; His overall approach focuses on improvement of the processes and in the system. rather than the worker who is the cause of process variation.

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Deming's universal fourteen points for management are given below:

1. Crease consistency of purpose with a plan
2. Adopt the philosophy of quality.
3. Cease dependence on mass inspection.
4. End the practice of choosing suppliers based solely on price.
5. Identify problems and work continuously to improve the system.
6. Adopt modern methods of training on the job.
7. Change the focus from production numbers (Quantity) to quality.
8. Drive out fear.
9. Break down barriers between departments.
10. Stop requesting improved productivity without providing methods to achieve it.
11. Eliminate work standards that prescribe numerical quotas.
12. Remove barriers to provide of workmanshig

His Principles For quality are:

- Quality is defined as conformance to requirements,not goodness"
- The system for achieving quality is prevention. not appraisal.
- The performance standard is zero defects. not "that's close enough.
- The measurement of quality is the price of non - conformance not indexed.

Cross by stresses motivation and planning and does not dwell on statically process control and the several problem - solving techniques of Deming and Juran.He states that quality is free because the small costs of presentation will always be lower than the costs of defection, correction, and failure.

The fourteen points of Crosby are:

1. Management commitment. Top management must become convinced of the need for quality and must clearly communicate this to the entire company by written policy, stating that each person is expected to perform according to the requirement what the company and the customers really need.
2. Quality improvement Team. Form a team composed of departmental heads to oversee improvements in their departments and in the company as a whole.

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3. Quality measurement. Establish measurements appropriate to every activity in order to identify areas in need of improvement.
4. Cost of quality. Estimate the costs of quality in order to identify the areas where improvements would be profitable.
5. Quality awareness. Raise quality awareness among employees. They must understand the importance of product conformance and the costs of non performance.
6. Corrective action. Take corrective action as a result if steps 3 and 4.
7. Zero defects planning. Form a committee to plan a program appropriate to the company and its culture.
8. Supervisor training. All levels of management must be trained in how to implement the part of the quality improvement program.
9. Zero defects day. Schedule a day to signal to employees that Tha Company has a new standard.
10. Goal setting. Individuals must establish improvement goals for them - selves and new groups.
11. Error causes removal. Employees should be encouraged to inform management of any problems that prevent them from performing error - free work.
12. Recognition gives public, on financial appreciation to those who meet their quality parts or perform outstandingly.
13. Quality councils , composed of quality professional and team chairpersons, quality councils should meet regularly to share experiences, problems, and ideas.
14. Do it all over again, repeat steps 1 to 13 in order to emphasize the never-ending process of quality improvement.

All of these pioneers believe that management and the system, rather than the workers are the cause of poor quality. These and other stabilizers have largely absorbed and synthesizing each others ideas. but generally speaking they belong to two schools of thought those who fous on technical process and tools and those who focus on the managerial dimensions. Deming provides manufacturers with methods to measure the variations in a production process in order to determine the cause of poor quality. Juran emphasizes setting specific annual goals and establishing teams to work on them. Crosby stress a program of zero defects. Feigenbanum teaches total quality control

aimed at the manageing by applying statically and engineering methods through out the company.

Despite the differences among these experts, a number of common themes arise.

1. Inspection is never the answer to quality improvement nor is policing.
2. Involvement of and leadership by top management are essential to the necessary culture of commitment to quality.
3. A program for quality requires organization wide efforts and long term commitment, accompanied by the necessary investment in training.
4. Quality is first and schedules are secondary.

SERVICE QUALITY, CUSTOMER RETENSION AND PROFITBILITY

The relationship between quality, profitability and market share has been studied in depth by the strategic planning institute of Cambridge. The conclusion based on performance date of about 3000 strategic business units is unequivocal. one factor above all others quality drives market shae and when superior quality and large market share are present, the profitability is virutaully guarangeed.

There is no doubt that quality and profitability are strongly related whether the profit measure is return on sales or retained as investment. Businesses with a superior product service offering clearlyout perform those with inferior quality.

In addition to profitability and market share, quality drives growth the linkages between these correlates.

Quality can also reduce cost. This reduction, in turn, provides an additional competitive edge. Appropriate product specifications and service standards leads to cost reduction. As quality improves, so does cost, resulting in improved market share and hence profitability and growth. This is turn, provides a means for further investment in quality improvement areas such as research and development. The cycle goes on.

The rewards of higher quality are posiive, substancial.Findings indicate that attending quality superiority gives the following organizational benefits:

1. Grater customer loyalty.
2. Market share improvements.
3. Higher stock prices.

4. Reduce service calls.
5. Higher prices.
6. Greater productivity.

ORGANIZING FOR QUALITY IMPLEMENTATION:

The traditional approach to organization sees the process as a mechanical assemblage of functions and activities without a great deal of attention to strategy and desired results. The process takes the product as given and groups the necessary skills and activates into homogeneous functions and departments. This approach to building an organization structure has been crinite by Peter Drucker."What we need to know is not all the activities that might conceivable y have to be housed in the organization structure. What we need to know are the load bearing parts in the structure, the key activities.

Key activities will differ depending on the nature of the organization, its products, and its steategy.what is a key activity in one many not be in another. Advertising may be a key activity in the value chain of coca-cola, but not in Boeing Aircraft, where design is the key activity. Back office activity may be a key activity I Merrill Lynch, but not in McDonald's. Firms frequently fail to customize or identify key activities in the value chain because of a tendency to organize around the start of accounts. Some firms focus on those activates where cost, rather than quality or other source of differentitation,is the major consideration.

The value chain concept provides a systematic way to identify the key activities necessary or quality differenzation and a way to group them into homogenous departments and functions.commiteed, an organization structure that corresponds to the value chain is the most economic and effective way to deliver quality and therefore achieve a competitive advantage.

It should be noted that the quality Assurance Department is generally not the load - bear - strategy activity when organizing for TQM.Quality assurance activities can be found in nearly every function of the company if these functions are viewed as links in the value ch... Any activity or function is a potential source of quality differentiation. The ill - defined or exclusive word "quality" may be narrow if it focuses on product or service alone.Moreever, such limited focus may include the many other activities that impact the customer's value chain. Not only those functions normally classified as "line" but a variety of "staff" functions as well can be the source of quality in the organization structure. Consider the following sample activities:

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Activity	Value of customer
Purchasing	Improved cost and quality of products.
Engineerigng and design characteristics	UNIQUE PRODUCT
Manufacturing	Product reliability
Order processing	response time
Service	customer installation
Scheduling	Response time
Inspection	Defect free product
Spare parts	Maintenance
Human resource	customer training

By listing the activities of the organization and comparing them to a value chain one can see the many potential ways that quality differentiation can be achieved. It should also be noted that these activities can lower customer costs as well.

Production of quality does not stop when the product leaves the factory. Distribution and service are part of the production process. Careful identification of customer value will reveal a number a other opportunities for quality differentiation. For example. buyers and potential customers frequently perceive value in ways they do no understand or because of incomplete knowliturers and service firms signal subjective. qualitative measures of quality. Do you buy Pepsi Coal for taste or brand image? Do you contemplate the purchase of Volvo for performance or long life and safety. consulting and accounting firms signal quality buy the appearance and presumed professionalism of employees. Banks are known to build impressive facilities to indicate quality Charles reason, formerly of Revlon once said. "I am not selling cosmetics. I am selling hope. The several criteria that the buyer may use to make a buying decision means that there may be and equal number of activities that become key activities in the creation of customer value. Porter provides several illustrative signaling criteria. to which firm examples and organization activities that become key in delivery of the criteria that the buyer may use to make a buying decision means that there may be an equal number of activities that become key activities in the creation of customer value. Porter provides several illustrative signaling criteria. to which firm examples and organization activities that becomes key in delivery of the criteria have been added here.

Of course, having signaled a particular criterion to buyers and potential buyers, it is necessary to deliver as promised, measure the effectiveness of the criterion, and keep customer feed back communication lions open to ensure satisfaction.

Delivery of quality products or services depends on how well the many activities of the company are organized and integrated. The measurement of effectiveness is fundamental to the TQM process. It now remains to organize for customer feedback, another key activity that impacts other functions and activities throughout the organization.

Measuring customer satisfaction. or dissatisfaction. is an essential but often overlooked activity. What happens when a customer chooses a banks trust department based on the criterion

Of experienced personal, only to be shunted off to a recent college graduate or ignored by a "customer representative?" research indicates that customers who are satisfied with a bank's quality will tell. on the average, three other people. while those who are dissatisfied will tell eight or nine others about poor quality. How does a customer feel when returning an item under warranty only to be patronized by a retail clerk? One survey found that for every problem incident reported to corporate headquarters, there are at least 19 other similar incidents which simply were not reported or which were handled by the retailer or the front line without being recorded. most companies spend 95 percent of their resources handling complaints and less than 5 percent analyzing them.

There is a strong correlation between consumer satisfaction with response to problems or questions and the likelihood of purchasing another product from the same company. Yet few customers bother to complain, and of those who do. Only a small fraction reaches top management. What is needed is the institutionalization of customer service throughout the organization as a key activity to be performed by everyone. Despite this evident need. many companies have neither the activities nor the supporting policies. For many who do, there is a conflict between organization and policies that may have an opposite effect. Covertly measuring quality by using mystery shoppers. holding motivational meetings which employees perceive as paternalistic and patronizing, and paying for sales rather than service are among those policies that may conflict with the need to provide quality products and service. It may be difficult for employees to be quality conscious in the face of policies that discourage this attitude.

4.20.2 THE BALDRIGE AWARD

An additional impetus was provide when the Baldrige Award was established 1987 as a result of Public Law and the background information on the law mentions foreign competition as the major rationale. No other business prize or development in management theory can match its impact. The award has set a national standard for quality and hundreds of major corporations use the criteria in the application form as a basic management guide for quality improvement programs. Although the award has its detractors, it has effectively created a new set of standards a benchmark for quality in U.S.industry.

Applicants must address seven specific categories. Meeting the criteria is not an easy matter. A perfect score is 1000. Of the Baldrige is the number of the application guidelines (167,000 in 1990) requested. In the first three years, 203 companies applied and 9 won: 6 manufactures, 2 small companies, and 1 service company (Federal Express). Winners of the award are required to share their successful strategies with other companies. IBM's Rochester. Minnesota site, home of the Applications System/400 and a 1990 winner. attributes the success of the division to the way in which it appropriated the ideas of Motorola, Xerox, and Milliken, winners in prior years. This sharing of ideas is a central purpose of the National Institution of the Standards and Technology, the administering agency. The sharing policy by winners ensures a multiplier effect.

Check your Progress

5. What is total business cycle?

4.21 COST OF QUALITY (COQ)

COQ: Cost to provide quality in everything the company does whether product or service related or the cost of non-conformance and the prince of Quality.

COQ IS calculated on the basis of how much it costs to get things correct or the cost spent on Rework.

Steps for costing Quality:

1. Assess the CQQ in non-manufacturing for example: Marketing/Sales/ services.
2. Assess the COQ in inspection and or Tests.
3. Cost of Prevention, Training, planning, forecasting, meetings and quality Assurance.
   - One hour of planning saves ten hours of problem"

- prevention is better than cure"

COST OF ERRORS IN REWORK:

01. Misunderstanding in verbal communication
02. Incorrect labeling.
03. Changes not communicated.
04. Material availability not in time.
05. Failing to follow agreed action.
06. Materia movements not documented.
07. Purchasing failing to appraise supplier.
08. Wrong interpretation of correct information by designers.
09. Time management failure.
10. Inadequate specification of requirements.
11. Orientation to short term rather then long term goals.
12. Failure to react to causes of problem.
13. Not maximizing production rates.
14. Lack of information flow.
15. Lack of training in operation and supervisory areas.
16. Failure to organize for absence while attending sources.
17. Down time maintenance.
18. Misformation.
19. No planned maintenance.
20. Maintenance delay cast of slow response.
21. Morale.
22. Material handling damage.
23. Housekeeping

4.22 SHORT COMINGS IN THE IMPLEMENTAION OF TQM:

Having observed a number of organizations around the world the majority who attempt to introduce the total quality approach fail. In face. It is estimate that about 80 percent of them fail, no matter how much money and time they have spent on the TQM effort. The attribution for this high rate of failure is the fact that total quality is perceived by many as a philosophy rather then as practical approach. Actually, most so called total quality experts have

suggested what to do, but they have no placed enough empaths on how to do it. however, this is not the only reason for TQM failure. Based on the observations, there are five main cases of this failure that is five conditions that must be met if attempts to implements TQM are to succeed. Weakness in either one or several of these conditions has caused the failure of the TQM implementation attempts.

The very first condition for success in the implementation of TQM is the existence of a sense of urgency to change things around, a conviction of the absolute necessity to modify a long standing way of thinking. IN successful organizations, top managers themselves, are both convinced and convincing. IN other words, they are committed to changes that TQM requires and they are able to convince the rest of their organization that these changes are essential. IN fact they convince not only their own managers and personnel, but also there outside partners suppliers, distributors, and so on who are key collaborators in the achievement of total quality. It is observed that where companies succeed in achieving and maintain total quality this conviction runs high close to obsession. intact.

The second condition for success is understanding the difference between quality and total quality and being able to define both in concrete and measurable terms. NO one can achieve something that is not clearly defined and measured. One must know not only what both quality and total quality are, but also what to do in order to achieve and maintain them. Business leaders are not totally to blame for this lack of knowledge. IN fact, this confusion about these concepts is exacerbated by these preaches a different gospel, a different approach, and gives own definition and interpretation of total quality. Wth the sweeping demand for total quality expertise, experts have sprung up every where and have invaded the business world. Definitions of quality and total quality around. However, the definitions are mostly too vague and sometimes even contradictory.

The third condition of success concerns the implementation process. A step by step methodology is required to successfully introduce, achieve and maintain total quality, and it should be rigorously applied. Systematic evaluation of each step is essential to success. Inother words, to practice TQM successfully, one must know why it is so adopt TQM,what quality and total quality are all about, and how to achieve, maintain and implement them.

The forth condition of success is knowing how to achieve total quality.

Wanting to change, and knowing what quality and total quality mean, are not enough to guarantee success. One must understand how to do it. conversely, understanding how to achieve quality will not likely lead to success unless accompanied by the will to do it clear definition of what the ultimate goal is To give illustration some companies neither attempt to convince people of the importance of total quality nor define quality and total quality in concrete and measurable terms. The embark right away on massive training programs for all employees on quality improvement techniques anc expect to reach some tangible and significantresults in the short term or, at most, medium tern-Typically the representatives of these companies expressed their need as a revivifying "shot in the arm". They had not understood that they could not expect to make a significant change in culture, habits, attitudes, and behavior by simply teaching people new techniques; they had no: explained why the techniques had to be used nor what they where meant to achieve. However once people are convinced that they have to achieve total quality and know how to define ano measure it, they, of course, have to be taught how to achieve it. Over the years, a total quality, technology has emerged that includes step by step processes, methodologies, and techniques such as policy deployment, quality function deployment, process management and reengineering_ problem identification and problem solving. The fifth condition is knowing how to maintain total quality. After the first rush of enthusiasm, there seems to be a cool down period; people observed to be losing steam, tailing of, slow-ing down; old habits reappear while posters and charts start collecting dust. Companies view it as a normal phenomenon and do not know how to revive the initial enthusiasm and keep it going. As the process slows down, skepticism replaces enthusiasm. These organizations had learned how to achieve total quality, they had convinced there personnel that change was imperative, they hac defined quality and total quality, they had even trained everybody to achieve it- but they did no: know how to maintain it, year after year. The solution to maintaining effort and interest in total quality lies in strong leadership on the part of management. The behavior of top managers must reflect not only their attitudes tower: total quality but also their recognition of there employees successes. Visible recognition of suc-cess in the form of celebration and rewards for employees is a particularly effective means of maintaining interest in total quality.

BENEFITS OF TOM CONCEPTS

01, Total Employees Involvement.

NOTES

02. Waste Elimination.

03. Lead Time Reduction.

04. Process Charting.

05. Inventory Reduction.

06. Value Analysis.

07. Failure Analysis.

08. Cost Analysis.

09. Complaint Analysis.

10. Energy Conservation

11. Towards Zero Defect Concept.

12. First Time Right Approach.

13. Nell defined Work Culture.

14. Improved Employee's morale.

15. Customer Delight and Preference.

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BENEFITS OF TOM CONCEPTS 01, Total Employees Involvement. 02. Waste Elimination. 03. Lead Time Reduction. 04. Process Charting. 05. Inventory Reduction. 06. Value Analysis. 07. Failure Analysis. 08. Cost Analysis. 09. Complaint Analysis. 10. Energy Conservation 11. Towards Zero Defect Concept. 12. First Time Right Approach. 13. Nell defined Work Culture. 14. Improved Employee's morale. 15. Customer Delight and Preference. . 102

IS - ISO - TQM

IS (Indian standard)

Third party certificate for PRODUCT QUALITY

ISO (International Organization for standardization)

Third Party certificate for QUALIY MANGEMANT SYSTEM

TQM (TOTAL Quality management)

Self Certification by demonstrating the implementation of TQM concepts.

4.23 INTRODUCTION TO ISO 9000 QUALITY MANGEMENT SYSTEM

A principle factor in the performance of an organization is the quality of its product of services. There is a world- wise trend toward more stringent customer expectations with regards to quality. Accompanying this trend has been a growing realization that continual improvements in quality are often necessary to achieve and sustain good economic performance.

Most organization - industrial. commercial or governmental- produce a product or service intended to satisfy a user's needs or requirements. Such requirements are often incorporated in "satisfaction". However. technical specification may not in them guarantee that customer's requirements will be consistently met. if there often to be any deficiencies in the specification or in the organizational system to design and produce the product or service. Consequently. this had led to the development of quality system standards and guidelines that complement relevant product or service requirements given in the

technical specifications. The series of international standards (ISO 9000 to 9004 inclusive) embodies a rationalization of the many and various national approaches in this sphere.

As far as the ISO 9000 quality management and assurance standards are concerned, the most commonly asked questions regard the definition of quality and of quality system; the content, application, and revision of the ISO 9000 standards; quality system approval / registration. European union requirements for quality system approval/registration; and related topics. The increasing number of inquiries about these topics is indicative of the expanding interest in quality in many sectors of the economy.

Quality improvement has now become both the corporate and the international business strategy of the 1990s. Large companies are making a public pledge of their dedication to quality Cadillac and Milliken and company proclaims in a prominently featured slogan that "Quality is job 1" and many other companies are followed suit. Under the automotive industry action group (AIAG) banner, ford, GM and Chrysler have joined efforts to develop and deploy a common quality standard based on ISO 9000. The result is the QS - 9000 standard, which put into place in 1994. At the international level, interest has mushroomed in quality system as a means of ensuring the consistent conformity of products or services to s given set of standards or expectations.

There has however been little agreement among either corporate management or professional in the field regarding the meaning of quality. The ISO standard 8402 defines quality as the totality of features and characteristic of a product or service that bear on its ability to satisfy stated or implied needs. However, there are problems with this definition. "To satisfy stated or implied needs" is good as far as it goes, but exactly whose needs are we talking about? Who are the customers of a product or service? There are situation where the question of whose needs are being addressed may lead to some ambiguous, even contradictory, answers.

A case in point is the testing services field, where the service being offered is the testing of a product for a manufacture. Totally erroneous test results may serve this client's need quite handsomely if the faulty test report can be used as a rationalization to allow the client to sell its product; in the instance, an accurate test report would only hamper the sale. Nevertheless, those erroneous results, felicitous as they may be for the manufacturer, are unlikely to satisfy the needs of the potential buyer of the standards of the

agency responsible for regulating the product. In this situation, the needs of the manufacturer and the needs of the user are clearly at odds.

Another situation in which one may have difficulty in pinpointing whose needs should be targeted occurs when a product or service is passed on by one company unit to another for use by the latter, and then subsequently delivered to the customer for its use as well. (An example on such a product would be a car manufactory division that produces batteries and sells them to another division, which installs them in the car). Although this could seemingly create a conflict between the needs of the internal customer and the external customer, in reality, this dilemma has no forms: As I have said before, there is no internal customer and this concept serves only to muddle the ultimate goal of all parties in the company - that of serving the external (and, indeed, the only) customer

In an attempt to address this problem of customer identification, ISO has added seven footnotes to its definition, including some making the further qualification that "needs can change with time" and that "in a contractual environment, needs are specified, whereas in other environments, implied needs should be defined. "This still leaves us with the problem of determining all of the parameters of the definition, for needs can be variously defined in terms of safety, usability, availability, versatility, compatibility with other products, reliability, maintainability, overall cost (including purchase price, maintenance costs, and product life), environmental impact, or other desired characteristic.

Even if all needs can be identified and adequately defined (often no easy task), what about the issue of what is known as an acceptable quality level (AQL) - the traditional idea of a maximum percentage of nonconforming products or service units that may be considered satisfactory as a process average? Stated in other words, how many mistakes can you make and still produce a quality product or service? A manufacture's production system may be considered by its customers to produce a quality product if the AQL is 0.1 percent that is only one in 1000 products contains defects. Yet a 1 in 1000 error rate for nurses whose job it is to hold babies (only 1 baby dropped out of a 1000) or for containers that hold highly toxic or hazardous materials (only 1 deadly leak for every 1000 containers produced) is obviously not acceptable. There is a belief among many quality experts and their disciples that the only acceptable quality level for any manufactured product or service is 100 percent (Zero defects), and that any failure to do it right the first time is not tolerable. This is not a universally held opinion.

Product quality depends on many variables such as the caliber of the components or materials used; the type of equipment used in design, production, handling, installation, testing, and shipping; the equipment calibration and maintenance procedures employed; the training and experience of production and supervisory personnel; the level of workmanship; and sometimes, the environmental conditions (temperature, humidity, level of dust particles) in the are in which the product is produced. The process, organizational structure, variable to produce a product of consistent quality which meets defined specifications is called a quality system. The standards that are being adopted globally for quality system are the ISO 9000 series standards.

QUALITY OF PRODUCT DEFINED

The international quality standard ISO 8402 defines Quality as the totality of characteristics of a product, process, organization, person, activity, or system that bear on its ability to satisfy stated and implicit needs.

First and foremost is the product's suitability for an intended use. In other words, we must know what the product is supposed to do.

Is it intended to transport; cut or weigh: or measure time, temperature, thickness, or hardness?

Is it meant to provide protection against material risk or injury, as in the cases of insurance does?

Is it to be used in health care services?

Is it designed to provide entertainment?

Is it aimed at getting a return on an investment?

Suitability can be either functional or non functional. It is said to be functional if the product performs the function for which it was conceived and designed. For example, a sword is made to cut; if it is serving as a weapon, its use is functional. But when it is used as a wall ornament, its use is non-functional.

A famous industrialist once said that he manufactured cosmetics but dreams. As we know, cosmetics are much more non functional than functional. Advertisements suggest that they can give their users beauty and youth, whereas what they really give them are illusion of beauty and youth.

Yacht clubs are established to offer their members a variety of services that allow them to sail or enjoy their motorboats, clearly a functional use. However, people can join an exclusive yacht club simple to enjoy the social

status that goes with it - a nonfunctional use - using its balloungs, and dining room facilities much more than its docks. People do not go to restaurants only to eat (a functional use); some go to conduct business meeting, others to enjoy an intimated dinner, still others for social gatherings (all nonfunctional uses).

It is vital to know what the consumer wants to do with the product, tnat is, what the intended of a product is. For example, if a sword is intended as a wall decoration, its ability to cut is not rtant on the contrary, it is imperative that it not if an accident is to be avoided. The nonfunc-al uses of a restaurant influence its floor design, decoration, and location, even more than the it serves.

The projected use of a product influences all stages of its design, .development, manufacture. packing. Moreover, the projected use affects most promotion: advertising, distribution :lay, and pricing decisions related to the product. Functional use can include both a main function and secondary functions. Cars are menu to provide transportation (the main function). An automatic. Transmission enables drivers :hanoe gears automatically. In terms of the product's use this is a nonessential secondary. that, for a great number of users, improves the product's performance. Eyeglasses may be corrective lenses (the main function) that automatically darken in sunlight (the secondary-action) and thereby become sunglasses. While companies continue to concentrate on improving and perfecting main product function. soma of them are also now endeavoring to innovate and develop secondary functions. We note that certain secondary functions are sometimes as important as the main function. or example, a car is meant primarily to provide transportation (the main function), but it has :ecome a given that the car should do so comfortably and safety (secondary functions), hence e importance of seat belts, shock absorbers, airbags, and so forth. To satisfy a need, a product not only has to be able to perforrri and achieve its intended reactive, it has to be able to do so for a reasonable length of time. This is called product durability. - car, for example, not only should be able to transport goods or passengers, but it must do so for certain periods of time, say 5 to 10 years, before it falls into a condition in which repair is no longer economically feasible. In some countries, where repairing a car is cheaper than buying a new one. :ars last more than 20 years.

Not only should products be durable and last a reasonable length of time, they should also e reliable. In general, reliability can be considered syn-

onymous with availability for use. Technically specking, reliability is defined as the probability of a product operating without breakdown or 'ailure for a given period of time under normal operating conditions. An electric razor is said to be 99 percent reliable in the three years if the probability of its breaking down is 1 percent for that period of time. When one buys a printer for a computer, the, technical specifications indicate an MTBF value, such as 2000 or 5000 hours. This value, which stands for Mean Time Between 1-ailureS, is another Measure or reliability and gives an indication of the time the printer can run cefore it has to be repaired.

In the service industries, reliability is measured by the percentage of time a service- is - available for use over a period of time. For example, if a high way is 99.9 percent reliable for the first year after it is constructed, it means that it can be used 99.9 percent of the time in that year under normal conditions - wars, earth quakes, accidents, and avalanches beil'ig excluded.

For some products, uniformity 'is a key ingredient of quality. Uniformity can be defined as a level of quality that is constant from one unit, shipment, or batch to another. Some canned - goods manufacturers add color to products - such as strawberry jam - to maintain a consistence ap-. pearance. A change in appearance could be construed as a change in the level of quality, even when this is not the case in the service industries, customers expect the same level of quality each time they use the service, whether the service is car repairs, hair cuts, or eating out. When travelling abroad to exotic countries, I some times look for food with familiar, taste and, hence, go to a McDonald's restaurant, because the uniformity of their products, - including their names (big Mac, McNuggets) - is well known around the world. Maintainability is another characteristic of quality. Maintainability includes the case of maintenance and the availability of spare parts and service for the product once it starts being used Many foreign car manufacturers wishing to penetrate a new market, such as the north American market, first make sure that a establish an extensive network of dealers and service centers. And they see to in that spare parts are readily available, that is, that most parts are stacked In that market or can be flown in on relatively short notice. However, many European car manufacturers have failed to penetrate the North American market because the local American mechanic at the - corner service station would not dare touch a European car, hence reducing their maintainability. The international quality standards series known as the ISO 9000 series and ISO 8402 adds another characteristic, namely dependability. Dependability is defined as the collective

term describing the available performance of a product. This performance is influenced by their reliabil-ity. the maintainability and the maintenance support performance' of the product. Other characteristics suggested in the standard are compatibility, which is the ability of entities to be used together under specific conditions to fulfill relevant requirements; interchange-ability, or the ability of an entity to be used in place of another. with out modification. to fulfill the same requirements; safety, the state in which the risk of harm to persons or damage to the prod-uct is limited to an acceptable level: and, finally, product liability, a generic term used to describe the onus on a producer or others to make restitution for loss related to personal injuring. property damage, or other harm caused by a product. There are other characteristics associated with quality that depend on the nature of the product : toxicity (for a paint), stability (for a drug or chemical), appearance, and so on. Quantifiable absolute or relative parameters must be associated with all of the aforementioned quality the characteristics. For example.. a file - passenger car capacity. a two - inch steel - cutting capacity. a 50 - pound weighing capacity. a 5 year product life. a 95 percent reliability. In banking services. quality can be measured by the variety of services offered - savings. loans mortgages. investment - or by the number of errors made in trArlactions, QUALITY AND. TOTAL QUALITY Product quality is defined by the customer and the customer alone. In the 1970s, Western companies started putting more emphasis on quality to keep their markets or recapture lost shares of their markets. However, in the 1980s, the concept of total quality appeared. This hot new topic -

some would even call it faddish - has been defined in different ways over the years, thus creating a great deal of confusion. Moreover, most of the definitions have been philosophical in nature. Some will say that total quality is a business strategy. Others consider it to be a new management philosophy. Still others say, "It's more than a program, it's a state of mind," or "It's not a program, a process". Even if they are correct, these definitions do not get us very far. As stated at the peg inning of this chapter, if we want to achieve total quality - or anything else, for that matter - must define it in concrete and measurable term:,

Rather than trying to find an academic definition for total quality, it helps in identifying the 'actors that guide and influence a customer's decision to buy or not to buy a certain product. The attributes that customers look for are as follows:

1. Quality : As we have defined it, this means quality in the product (goods or ser-vices) and in the accompanying ancillary services. These comprise presale services (that is, demonstration, free use, information about the various products offered, arid so on): services provided during the acquisition (installation, servicing, maintenance, warranties).

2. Volume : Volume means delivery of an item in its required quantity or size, or delivery of service to a certain number of customers.

3. Administration : Systems and procedures that a customer experiences are stream-ned, rapid, and free of errors. These encompass all the customer's dealings with a company, covering everything from ordering a product to receiving the invoice and paying for the product or service: from customer credit revaluation and other confirmation, procedures or modifications to -equests for technical or commercial information, complaint procedures, and processing.

4. Location : Customers - existing or potential, possible or probable - Want the prod-uct to be available or delivered at the desired location.

5. Interrelationships and Image : Customers want to be treated well, promptly, and courteously, and they want to have good relationships with company personnel or representa--, ves. They also like to do business with a company that has a good image, respects the environ-ment, and is community minded.

6. Timely delivery of the required product or service.

7. A maximum yield from the product. For the customer, this concept of yield involves -lore than paying the lowest price possible. Actually, customers are ready to pay more for a product if its benefits - such as reduced .operating costs, or high resale value - are higher. Yield also entails getting maximum value for the money, not only in the short term but in the long term as Nell. Some people call this the cost - benefit ration.

DELIGHTING THE CUSTOMER

For customers, total quality goes still further. In fact, with competition now on a worldwide scale, it is no longer sufficient for a product to satisfy a customer. Keeping and developing a market means going beyondlerat. This concept proposes exceeding the expectations of customers

II. Preparing for the start-up

5. initiating a total quality diagnosis

6. Establishing a training program

7. Organizing for total quality Ill. Starting the process

8. Launching the process on a limited scale, then gradually extending it everywhere.

9. Continuously evaluating the process and its results; readjusting as necessary

10. Setting up a continuous reinforcement process. The periods of time would differ in length for each case, depending upon a number of 'actors such as the size of the organization, the complexity and diversity of the products it offers, the geographical centralization or decentralization of the location of the main administrative and production units, and so on. For example, for a small business, these periods would represent a month, while for larger organizations they could represent two or even, three months. Again, this timetable is applicable to most organizations but should be adapted to the specific conditions of any business about to introduce TQM. It is, in order other words, a relatively of how such time--.abies are constructed.

SUCCESSES AND FAILURES IN THE IMPLEMENTATION

Stratton asked five professional quality specialists about the conditions of success and the :auses of failure in the TOM process. Largely speaking, there are four categories of factors that affect success : leadership, culture, the launching process, and training. There are other factors with some influence on the process, but they cannot be placed in any of those four categories.

1. A leader is needed to oversee the process. The leader champions the approach and is utterly convinced that the process and the direction taken are fundamentally sound. The leader is ready to risk his or her own career and position to persuade everyone of the paramount importance and necessity of creating total quality.

2. To achieve total quality, the experts state that the company's culture must be changed and a participative style of management set up everywhere in the company.

3. The launching process begins at the highest management level. Then, each divi-sion. decides how it plans to join in the process. Isolated uses of the process (a smattering here, a smattering there) are not to be tolerated. The process, rather than being imposed, must be ac-cepted before it can be implemented.

4. There must be training for everyone. The training is to be balanced. with equal measures of management and techniques. There is no selective training. where some employ-ees are trained and others not. Managers and employees get the same training. The training sessions are not limited to sensitization sessions.

A Particular Car rental company provides another example of ACE .This Company has eliminated all administrative procedures for its airport customers .for example .waiting at the counter signing acontract .taking possession of the keys. and so on. On leaving the airport. passengers are driven in aComfortable bus to a parking lot where their names are displayed(no flags though ,for now .but whoKnows?).Their rented car awaits them with the engine already running .If the weather is very hot, the air conditioning has already cooled the interior, if it is very cold, the car si already warmed up. The only thing left for the customer to do is to get in and drive away.

Everybody knows that it is not always easy to anticipate the exact nature of customer needs.This is one of the greatest challenges of defining quality. To illustrate the point a telephone is used primarily for verbal and electronic communication between two customers: nevertheless. for a telephone company. total quality goes much further than ensuring the quality of communication .It means providing customers with directory assistance and information (delivered with a pleasant tone of vocie.courtesy.speed.exactness.and so on):billing (invoice format and content);information of interest to customers: unpaid -bill reminders: prompt correction of billing errors:and various directories and services that are unsolicited but nevertheless useful.An American bank intimated its quality improved process by drawing up-with the help of its customers -a list of 700 customer -defined total quality indicators. These indicators can be given absolute values(such as number of errors and waiting time).or relative values (degree of satisfaction .courtesy of staff)on scales from 0 to 10.

MANAGING QUALITY

Quality does not happen by chance: it has to be managed. like business management in general. Quality management is a group of activities whose aim is to define a certain number of objectives and achieve them through the optimum use of the resources available. it includes all the activities involving planning. organization. direction, control.and assurance that the manager has to perform in order to achieve the requisite quality .on time. and at the best possible cost. Planning involves defining -for each individual .service.sector.or

NOTES

division of the business-what quality consists of, and than determining the means to do it, this means identifying the internal partner downstream and the end customer, establishing their needs, and determining what to do in order tomeet or exceed their expectations .Organization involves determining the administrative structures and allocating the resources as well as establishing the system and methods necessary to achieve the quality defined and specified in the planning phase.Direction concerns all the human aspects of management motivating and mobilizing personnel ,providing support ,exercising enlightened leadership,adopting a management style conductive to the attainment of the established objectives, resolving fonflicts in the workplace and soon.

The purpose of control is to detect errors or defects, results are measured ,then compared with thestated objectives in order to spot and correct any deviation. Quality assurance is achieved through a group of preventive activities intended to ensure the quality of the results. These activities systematically ensure that planning organization, direction and control are executed correctly, quality assurance consists of verifying that these activities have been carried out efficiently, thereby guaranteeing that an optimum level of quality is reached. It is the same concept that accounting auditors use in internal and external auditing Quality assurance consists of periodically auditing existing systems and procedures, manufacturing and administrative processes and finally materials am products(goods and services) received as well as finished products and work in process. A clear distinction must be made between management, control and assurance, for they are still often confused just as much in theory as in practice.

Through quality management . the required quality can be attained, through total quality, management, total quality can be achieved and maintained. In fact every business has a number of strategic objectives -economic, social technical commercial that are achieved by reaching the company operational objectives, as already mentioned, the underlying aim of TQM is to procure profitability is achieved by satisfying people needs collaborating closely with external upstream and downstream partners and at the same time respecting the environment that we leave as a legacy to our descendants

The success of TQM will therefore lie in accepting challenge to simultaneously satisfy the three stake holders of the total quality triad,s tock holders, customers and people in one of my recent seminars a participants asked which of these three should take priority. Another participant offered a surprising analogy that I had never thought of just as with color television, where the

three elementary colors must constantly be jugged and adjusted to obtain an image with the full spectrum of colors the trick of TQM is to judiciously divide and shift one's attention between all three elements in order to create the most perfectly balanced picture possible. For examples in the public sector should one be primarily concerned about the taxpayers and their tax load, the customers (in case the beneficiary of services) or the pubic servant? The challenges for those responsible is to find a happy balance between these three concerns.especially since the three occasionally happen to be rolled up into one and the same person.

TQM is consequently one of the most important aspects of business management and its importance is increasing. For an organization to reach its strategic objectives. everyone in change of a function with in the company must participate in achieving total quality . Total Quality Management is thus a matter that concern both top management and any one in charge of a company operations. It should not be considered as purely technical and consequently left to technican however competent they may be. This in no way diminishes the importance of the technical however competent they may be. This in no way diminishes the importance of the technical elements of quality management . such as statistical quality control. process analysis or design of experiments. but all the same .TQM is not limited to these elements. In the following chapters we shall examine the various activities involved in TQM

How can the nation of total quality be appled to a function such as personnel? Take the example of the corporation that wanted to recruit university graduates with average marks of 85percent or more form five different geographic regions. The recruiting campaign results showed that applications had been received from only two regions and that the candidate's average marks was 78percent. Hiring department staff found some explanations for these results by employing techniquesused in TQM. such as Pareto analysis and Ishikawa's cause - and - effect diagram (which are shall lookat in chapter 13). The new recruiting campaign took heed of these finding and. as a result. foundcandidates from five regions with average marks of 83 percent.

The number of corporations and organizations interested in the total quality approach is slowly

but surely increasing. and. surprisingly. this phenomenon is not limited only to the industrial and privatesectors but extends into service and public sectors.

4.24 QUALITY RE - ENGINEERING

When reengineering is implemented, the objectives of total quality must always before most if

success is to be ensured. Otherwise, implementation can be costly and still not yield acceptable or long- term results. QR emphasizes radically changing the existing processes under the assumption that

those changes will definitely improve the company's global performance or the performance of one of its specific processes. However, to be effective, the company's internal organization and processes should be directly and formally linked to enhance profitability through the fulfillment of its customer's need. Provided that this relationship is correctly and explicitly established right for the start, then reengineering can be one of the best tools to achieve total quality, and it will significantly improve a company's performance.

The following example illustrates this point:

In a large company, people were complaining about the purchasing system. The purchase requisition process was too lengthy, and the whole purchasing process was cumbersome and error.

Many managers attributed the organization's declining performance to the inefficiency of this process. So a QR team was set up. The team worked hard to rethink the process scratch. Cycle time was shortened, some procedures were totally eliminated, more sensible of computer systems wereintroduced, and errors avoided. However, the general performance of the organization deteriorated still further. It was then revealed that errors made out of the purchasing department were now processed even faster and more efficiently. This reengineering project failed because it had been assumed that changes in the purchasing process would significantly improve the company'sperformance; there had been no priority to specifically link this process to the company's profitability and customer satisfaction everyone had been working under an assumption rather than on facts.

In no way does this mean that reengineering is inefficient or even dangerous; neither does that partial reengineering should be rejected or even that only companywide projects are successful. It merely points out that, in the absence of a global diagnosis, it is possible to make the assumption that agiven process adversely affects the performance of an organization reengineering efforts based on such an assumption will obviously lead to failure.

QUALITY RE - INVENTING

In order to cope with the changes now we face, companies are being advised to reinvent organization, redesign their business processes, and recreate their corporations Reassessing, repositioning, reconfiguring, restructuring, and revitalizing the business can be done by adopting new approaches, applying new methodologies, and using new techniques already developed or in the process of development. For example, the new concept of extra - aversive management is replacing traditional accounting systems: and Activity Based Management (ABM) is helping to optimize the use of resource by identifying and managing the most critical value - adding activities in the organization.

In order reengineer the business successfully, one has to examine all of the elements of the total quality concept - that is, the needs of the shareholders, customers, and organization's members - then identify the mainstream process operations and management of these activities (planning, organization,direction, and control) as well as the support processes, such as finance and personnel management.

The business process can thus be broken down into work processes, activities, tasks, and elements. This examination should show that each facet of the business process contributes to the achievement of the global objectives of the organization and to the well - being of its people.

In fact, the major feature of this global approach, as compared with the traditional one, is its shift form a micro-vision to a macro-vision of the organization, its systems, its structures and its work methods. Macro-version nevertheless includes micro-vision within its larger scope. Instead of assigning individual department or sector-based objectives, all departments and sectors in the organization have the common, explicit(rather than traditionally implicit) objective of contributing to the company's shareholder and customer-driven global objectives. That is what the concept of extroversive management is all about. This approach many appear simple, possibly even simplistic, but it is based strictly on common sense. Nonetheless, these is no denying that integrating, all activities within an organization, in addition to taking into account the external upstream and downstream partner's activities presents a serious challenge.

IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT

As we all know, quality, long deemed a technical matter, was traditionally left in the hands of specialists. Then a concern for quality began to arise

within company hierarchies. Hitherto limited to industrial operations, the notion of quality has penetrated not only service sectors but also government agencies. Moreover, many companies have shifted their concern from quality to total quality. On the other hand, a large number of organizations have failed in their attempt to achieve total quality, while others have been disappointed with the results they have so far obtained.

The reason may be that, before embarking on such a venture, these organizations do not take the trouble to convince every single person in the organizations, from president to worker, that maintaining and constantly improving quality, in the total sense of the word, is of paramount importance. They put great effort providing training on TQM techniques, yet make no effort whatsoever to arouse and maintain any enthusiasm among their members to practice the basic concepts of this approach systematically and continuously. Even if the training goes well, they fail to make sure that the interest and enthusiasm of their people is kept alive, day in, day out, year in Year out. Even a Rolls Royce will stop running if nobody puts gas in its tank! Recently, it has been observed that a number of these disillusioned organizations are reverting to business process reengineering which, they are told, is rather than TQM- the way to go.

As indicated earlier, failure to achieve total quantity is not due to the ineffectiveness of this approach or its importance to generate significant improvement. It is because top management isnot committed to the total quantity process, or if that is not the case, then because management misunderstands its basic concepts, ignores its technology, or fails to reinforce the efforts spent to achieve and maintain total quantity. This chapter is about how to successfully implement TQM. Pitfalls to Avoid When Implementing TQM

As a ready indicated, TQM is not a time-limited project or program, with a starting point and a finishing point. It is a continuous process only ending if and when the business ceases to exist. Because this process is essentially based on a philosophy, on the way of thinking and acting. One cannot think of introducing it into an organization in the same way that one would install a new piece of machinery, a brand-new computer, or an inventory control system.

I suggest that companies that have failed to introduce and maintain total quality have tried to practice only some components of TQM. In effect, often without any prior groundwork or preparation, they have tried to introduce

new techniques or methodologies which they look to be the essence of TQM, but which were really only visible manifestations of it.

If total quantity is to succeed.10 essential and indispensable conditions must be met.

These are as follows

1. Top Management must have a definite will to implement TQM. The conviction that TQM is an absolute necessity for the company's progress. This includes all members of the top management team including the CEO.

2. The company must have a global, concrete and measurable long term vision of total quantity. It should reach for beyond the quantity of the company's goods and services and go to the extent of simultaneously satisfying the needs of the stockholders, customers and the organization's people, that is , the total quantity triad. The whole enterprise must adopt extroversive management.

3. There should be acceptance of the fact that the CEO has personal responsibility for total quantity and cannot delegate this responsibility. He or she has to be implicated in and visibly practice. total quantity. The CEO's approval and support alone will not be enough to make this approach successful.

4. The CEO and the top management team must share the deep conviction that only teamwork involving genuine participation on the part of all the people in the company - lower management and workers, middle and upper management - can bring about total quantity.

5. All the people in the company as well as the stockholders and the customers must be mobilized, sensitized and even educated to the necessity and effectiveness of TQM.

6. People must receive appropriate training and be well versed in the notions and technology related to TQM (the means) and the effective use of this technology to achieve and maintain total quantity (the objective).

7. All people must receive reinforcement in the form of formal recognition from the higher management as well as from all the managers, an formal recognition (personal recognition from managers even peers). Awards or other forms of rewards. Periodic gatherings bringing together the greatest possible number of managers and workers to celebrate the successes attained.

8. There must be open and frank communication on the part of management and generous dissemination of information that has traditionally been

reserved for managers or these working in specific departments such as marketing or finance.

9. Upstream and downstream partners must be sensitized to and educated about the necessity and effectiveness of long-term TQM, for their own good as well as for the company's.

10. Customers and stockholders must be educated about the necessity and usefulness of long-term TQM, in their own interests and the company's alike.

As indicated before, companies that have successfully introduced TQM did so by meeting all of these conditions. Top managers were strongly willing to change and accurate and measurable definitions of both quality and total quality had been developed. Moreover managers knew how to implement total quality, how to achieve it, and how to maintain it.

In addition, all personnel understood and strongly believed that, for the benefit of everyone, a company must be profit oriented , customer driven, people centered, partner assisted and environmentally conscious.

If any these prerequisites are missing , you cannot call your approach TQM. Systems might be established for quality management. control, or assurance, but they cannot be considered TQM- th ... a fundamental difference and the results are not the same. Ideally, therefore to introduce TQM, all people in the organization, from top manager to ground-level worker,must be completely convinced from the very outset that total quality is paramount. They haveto realize that it ensures their jobs and their future and is the very source of their pride and satisfaction.

Once TQM is launched you can expect to see short and medium - term results, but lack of spectacular or rapid changes in the very short term should nevertheless not be cause for discouragement. Some companies have successfully launched TQM and even received prestigious awards for it but have subsequently encountered serious problems. Undoubtedly, launched this process generally requires a change in the company's culture. This change demands special efforts many procedures have to be formalized, and measuring and follow-up tools have to be implemented - all of which entails creating a certain amount of bureaucracy.

This additional bureaucracy, if allowed to proliferate, becomes dangerous when the process has come to maturity and cruising speed is reached. Companies who are unaware that this is happening get bogged down, ossified

in a bureaucracy which, although necessary when the process is started, affects their performance negatively when the maturity stage is reached, instead of improving it. When left untested, this bureaucracy can be likened to crutches, which granted help a wounded man to walk (or the process to be started) but then hinder him from walking properly once he is cured.

NOTES

A.DODANO, A PSYCHOLOGIS AND SEVERAL COLLEAGUES HAVE STUDIES SIGNS of change, readiness and resistance. They looked for the common traits of companies that adopt new business practices successfully. They have identified 17 factors that are essential to successful change.

1. Sponsorship for changes.
2. High-level leadership
3. A strong sense of urgency from senior management
4. Mobilizaton of all relevant parties employees, the board, customers, and so on for action.
5. Performance measurements.
6. A suirtable organizational context
7. Flexible functional executives to faciliatate cross functional efforts
8. Bench marking
9. Customer focus
10. Rewards
11. Rare and well received re organizations
12. Communication
13. A horizontal organization with few hierarchylevels
14. Prior experience with change
15. Innovation
16. An effective decision making process

When IQM works, a company gets all the its normally accuring benefits, such as better financial results and better returs for the share holders, customer loyalty market expansion, and a reputation for reliable products and services. However, a trend has been noticed in which some successful companies tend to slow down their total quality process. Let us take the Japanes example. Some time ago the French newspaper, Le Monde, ran an article entitled, "La qualite japonise, la fin d un mythe"(Japanese quality, the end of a myth"). A French importer of Japnese cameral dared to admit, "On some mod-

els, 15 percent are defective when we unpack them". An official from an after - sales service company revealed that "12 percent of the video machines break down in their first year, regardless of make". ON several occasions, the Japanese government has to take its industrialist to task publicly.

The reasons for this decline in quality are numerous and provide some lessons worth learning. The main lesson, however, is that companies should not rest on their laurels and glide.

Along,propelled by the momentum of past victories. First of all, the years of supremacy enjoyed by several Japanese industries has given them near monopoly on the world markets and has undoubtedly reduced whatever urgency they may have felt in facing any sizable competition. Secondly, their economic and technological success has resulted in constantly rising currency values and sometimes, the obligation to invest abroad. The Japanese are thus importing more and more parts from other countries, parts that are not always of high quality. Thirdly, completion within japan is such that industries are constantly innovating and to counter competition, putting products on the market by reorganizing companies, empowering personnel, and imposing stricter control on products manufactured abroad.

Implementing TQM: External Consultants:

Most companies embarking on TQM call on external consultants, whose numbers are proliferating in direct proportion to the interest that company managers show in this subject. Care and caution must be exercised when choosing a consultant. Some of these consultants call them. Selves total quality experts or specialist. "but they are not in fact, experts in the field.

Unfortunately, there is no magic formula to help those seeking assistance. Avoid these clever nd expensive advisors a necessary evil, as one of my clients calls them. Nor is there any organization, either able or willing, that can appraise the quality of these consultants. Only an expert could do that, and only then if there were some way to define what qualifies him or her as an expert above all others. All I can do is recommend that the choice of an external consulter to be made carefully and objectively if that is possible because success or failure may depend on that choice. I have observed that it is better not to launch into the area of total quality than to do so and fail.

Generally the company will have to choose the candidate consultant after studying and companying his or her achievements; assessing his or her reputation, knowledge and communication skills, and sizing up his or her abil

ity to train the persons in the company to assume the responsibility of monitoring and participating in the introduction of TQM. All of these considerations are far more important than how well the consultant promoters and markets his or her services.

The program for implementing TQM:

The methodology that we have developed and applied for implementing TQM cosnsists of three phases and 10 steps as follows;

1.Pre-requisites for TQM implementation:

1. Sensitizing and familiarizing top management
2. Creating a steening committee to manage total quality
3. Appointing a coordinator or coordinating committee
4. Mobilizing internal and external partners.

II. Preparing for the start-up

5. initiating a total quality diagnosis

6. Establishing a training program

7. Organizing for total quality III. Starting the process

8. Launching the process on a limited scale. then gradually extending it everywhere

9. Continuously evaluating the process and its results; readjusting as necessary

· 10. Setting up a continuous reinforcement process. The periods of time would differ in length for each case. depending upon a number of 'actors such as the size of the organization, the complexity and diversity of the products it offers, the geographical centralization or decentralization of the location of the main administrative and production units, and so on. For example, for a small business, these periods would represent a month. while for larger organizations they could represent two or even, three months. Again, this timetable is applicable to most organizations but should be adapted to the specific conditions of any business about to introduce TQM. It is, in order other words, a relatively of how such time--.abies are constructed.

SUCCESSES AND FAILURES IN THE IMPLEMENTATION:

Stratton asked five professional quality specialists about the conditions of success and the :auses of failure in the TOM process. Largely speaking, there are four categories of factors that affect success : leadership, culture, the

launching process, and training. There are other factors with some influence on the process, but they cannot be placed in any of those four categories.

1. A leader is needed to oversee the process. The leader champions the approach and is utterly convinced that the process and the direction taken are fundamentally sound. The leader is ready to risk his or her own career and position to persuade everyone of the paramount importance and necessity of creating total quality.

2. To achieve total quality, the experts state that the company's culture must be changed and a participative style of management set up everywhere in the company.

3. The launching process begins at the highest management level. Then, each divi-sion. decides how it plans to join in the process. Isolated uses of the process (a smattering here, a smattering there) are not to be tolerated. The process, rather than being imposed, must be ac-accepted before it can be implemented.

4. There must be training for everyone. The training is to be balanced. with equal measures of management and techniques. There is no selective training, where some employ-ees are trained and others not. Managers and employees get the same training. The training sessions are not limited to sensitization sessions.

5. Other factors. The process is aimed at the long term. The goal is not simply to eliminate customer complaints. It must be to find out what customers want and then exceed their expectations.

Finally, let us look at some thumbnail scenarios to illustrate why some quality programs have failed in spite of their high implementation costs to the company.

1. Cosmeticism : The quality program, or a similar recommended alternative, is introduced on a superficial level, so that it remains an empty, outward form, like a Hollywood stage set. The company wants the cure, but it doesn't want to swallow the medicine.

2. Firemanism : When faced with a crisis or problem, the company rings the fire bell and tries to apply a quality approach rapidly. It pays no attention to the prerequisites; it looks no further than the short-term solution.

3. Pontius pilate-ism : Quality has to be improved; managers all agree on that. They take immediate and concrete action: they hire a brilliant quality

managers and give him or her free rein, or practically free rein. Management conscience is clear, it washes its hands and turns to more important problems.

4. In-adequatism : Can you use a fire detector to put out a fire? Statistical process control cannot solve a lack of motivation, even if it is costly to implement.

5. Individualism : Each to his! Designers devise their plans; workers carry them out; each has his or her own responsibility. What's there to talk about? The worker doesn't know how to draw up a plan, so how can she possibly discuss it with the designer? If the worker thinks that the plan is badly drawn and products are defective, it's assumed that she's looking for a scapegoat. If she knew how to design she wouldn't still be on the shop floor. Each individual barricades himself behind his own specially, as though it were a fortress.

6. Hidebound traditionalism : We've always done it like that,as long as any one can remember. Why should we suddenly change it now when it has always worked in the past?

7. Sloganism : Posters are plastered all over the walls. Someone must have gone to a workers' republic and decided that shouting slogans about quality in unison would somehow do the trick. "zero defects!" "Do it right the first time!" (why not "Do it right every time"?)"If you were a customer, would you buy this?" or even " Quality = pride." Regardless of all the campaigns, the company continues to produce continues to produce unquality products. Management can't fathom why-they through the posters were so good!

8. Copycatism : (keeping up with the joneses). Everybody id doing it, so we might as well, too. If the competitor has set up 10 quality improvement terms, we'd better have twice as many. What good will that do? It'll improve the quality' " At least this is what we hear from people who have visited japan".

9. Gadgetism : This thing about cross-functional terms is going to solve our problems, SPC does miracle-a consultant told us so. He must know what he's doing, at the price we're paying him.

10. compartmentalism: They are implementing a quality improvement team in work shop and SPC in workshop D. But what about workshop E? We will try quality assurance there. The rest of the plant is too big. We will think about that later on.

TEAM WORK, TEAM SPIRIT AND TEAM BUILDING

Usually, total quality improvement terms, or reengineering terms, have between 4 and 12 members and meet regularly, on averages once a week for about an hour. Their meeting room must be located in a quite area. conductive to work. All of their work must be documented, and someone is chosen to take the minutes of each meeting. Members can take turns doing this task. The team members are tree to call in a specialist to help in cases where they need more in depth should be recorded and given due recognition. Normally total quality improvement teams are members of the same production or administrative unti, while reengineering team are of a more cross functional nature.

Other Types of Team Work

While traditional quality circles or problem.solving teams can improve quality and reduce cost, their members have no authority to make decisions or effect important changes. According to Hoerr, some companies have expaned the concept of quality circles and set up groups or work teams with specific. designated responsibilities. Teams such as these have been charged with designing and introducing new methods and technologies, organizing meeting with suppliers and customers, and coordinating different departments. in unionized companies, executives and the union collaborate in making operations related decisions

Hoerr observes that in North America, to be really effective, the team work must involve some participation in decision making and in actual management and not be limited to problem solving, as is the case with quality circles. Self managing work teams, made up of between 5 and 15 employees, are assigned the entire responsibility for a product. Its members are able to carry out all of the tasks connected with the product and take turns performing these tasks. IN addition the team tasks on the responsibility of planning and scheduling work. its members vacations and production related purchases.

Organizations using this type of team work have seen a 30 percent increae in productivity and substantial improvement in product quality. It is a question of molding the organization into a horizontal shape, where there is no need for supervisors. Employees are in effect their own bosses. This type of team work, it seems, should be spreading. Accounting to Hoerr, it is the organizational shape of the future for those who want to be and remain competitive.

Team spirit:

The notiton of common objectives creates team spirit an indispensable ingredient in the achievement of total quality as everyone can share the pride of meeting challenges nd achieveing objectives together. AT the vey beginning of my professional life. I worked in the merchant navy. I observed that , on any given ship, there were groups that were practically autonomous. Navigation or check officers made sure that the ship stayed on course. Keeping themselves busy using maps, compasses, dividers, and sextants. Engineer officers spent their time making sure That the engines ran smoothly and were maintained correctly. Others looked after the galleys and administration. Everyone had his or her own problems; and no one dared step foot into another's territory. A lost map was the exclusive problem of the deck-officers, a burnt meal was the responsibility of the cock, a squeaking engine was looked after by the engineers, and a passenger's lost passport was dealt with by the purser. People would commonly dismiss a great number of problems as not being their problems.

Members of the different groups were living among themselves, ready socializing with each other. Actually, there was an unspoken antagonism among the groups, as the deck officers, with the captain of the ship at their head, thought of themselves as the masters of the vessel (the caption of the ship is, indeed, called the master). The engineer officers were frustrated because they were convinced that they were the most important people on board. Their job of running the complex engines of big liners was no small task, quite unlike that- or so they thought- of the immaculate, white- uniformed deck officers who spent their time gazing idly at the stars and playing with maps.

One day, while crossing the Atlantic Ocean, the ship sprang a series leak in one of the cargo holds. For once in my sea life, I noticed that no one on board suggested that the leak was not his problem. Suddenly, the whole crew had a common problem, one of survival. Instantaneously, a spirit of collaboration was born. Rank or authority mattered no longer. The question now was one of having the appropriate skills to contribute to the solution. Uniforms, stripes, and titles were put aside, and officers and crew sat around a table to share ideas and suggestions without regard to rank the now uniformless, stripeless master of the ship- looked silently and respectfully at the most competent and skilled person available to solve the common problem.

The problem was solved, and the atmosphere on board ship was never

the same again. A very strong sense of belonging to the same team had been instilled into all shipmates, officers and crew alike. They made an undeclared, unanimous decision to wear their uniforms only for official occasions. I have often recalled this incident as I have worked in companies and deplored the absence of an objective or common challenge that would unite its members. Yet it is this situation that I continue to see, and it brings home what that incident taught me. When different departments or groups in an organization systematically segregate and closer themselves, energy is wasted. Many times I have dreamt of being able to pierce a hole in the company's hull to make everyone realize that they all have a common objective and that everyone is working for the same cause- to survive together.

To further emphasize this point, in a hospital where several of the managers themselves admitted that the words patient or sick person were never mentioned in their mission statement the buyer bought, the computer specialist computed, the accountant accounted, the human resources manager hired and trained, the storekeeper looked after the inventory, and the chefs did the cooking. They were amazed when I asked them if they had ever had any patients in that hospital-the patients who should have been their common and only goal. Recently, a reengineering/total quality coordinator at a large railway company confined to me that the biggest discovery that

Enables them to get on well with their continuous improvement. They know how to combine day-to-day modifications to the process and innovation. Their shared decision-making process facilitates change.

A 'rising dynamism' emerges from the shop floor where people instigate improvements daily. New ways of doing things are proposed by the work group to the team manager who accepts them or rejects them after consulting with technicians responsible for the work processes. Supervisors, therefore, spend a lot of time articulating and harmonizing and consulting over decisions. Eventually from everyone's ideas and feelings about matters they build an unshakeable consensus.

The origin of the world 'Synergy' is in dispute with some saying it is an old medical term used to describe the way parts of the body work harmoniously together, while others argue that it is a made-up word. Its meaning, in management parlance, is clear-synergy is the result of team work in which the output is greater than each of the result of team work in which the output is greater than each of the inputs taken separately and also greater than the sum

total of the inputs. Two plus two equals five or seven or nine or fifteen in synergy. Watching the indomitable New Zealand All Blacks triumph over other rugby teams including the Barbarians and the British Lions, as they did in the autumn of 1989, in an object lesson of synergy in team work. As a team they were invicible in the autumn of 1989, stretching their impressive record of victories. In the last decade the All Blacks have only seven losses and four draws, yet the All Blacks had no outstanding players and man for man were outweighed by the Barbarians and the British Lions. What they had was phenomenal team work fuelled by fantastic commitment and training. In short they were dedicated to total quality rugby. Before leaving the stadium after every game, they reviewed their major mistakes with a view to preventing them in the future. They were inventive and creative in changing their style of rugby without even losing sight of their familiar urgency and efficiency in ply.

The All Blacks achieved this by setting their own standards: they sought not to win but to play the perfect game. Practice sessions were short but intense. Everything was done at top speed with the aim of producing a completely error free session. The dictum was perfect practice makes perfect. The team visualized a staircase, where every stepwise advance was only preparation for the next step. During matches they focused on incremental improvement: even if a move produced a try, they would attempt to find a small fault in the timing which needed improvement. This could represented the ultimate in TQM's thrust for perfection.

The overall responsibility for physical preparation for the world cup was shared between the caption, the coach and specialist trainers. Mental preparation was the sole responsibility of kirk,as captain.

He [Kirk] imposed his style on the traditional pre-match routine.

Make a powerful marketing team. In addition, Deere has begun an experimental program in which hourly workers pay rises are tied to the completion of technical courses and the demonstration of their new skills on the job.

Team Building

Teamwork is essential to achieving total quality. However, merely organizing employees into teams is not enough. They have to learn how to work as a tam, hence the very important role that team building plays in implementing TQM. It is an organizational development technique whose aim is to increase the efficiency of work teams within the organization. It is, in effect, a kind of apprenticeship for working as a team within participating to the ut-

most and is built on the assumption that all members of the team have mutual respect.

NOTES

Before beginning to use team-building techniques, it would be wise to examine the qualities that make a team function well. The prevailing atmosphere in an efficient team is relaxed, everyone is at ease, and no one is unduly concerned. The discussions are lively and centered on the task at hand, and everyone participates. If the discussion ranges off the topic, someone quickly brings it back on track. Everybody understands and accepts what the task is, because open discussion to decide on the objective precedes the meeting and. thus ensures that all team members feel fully involved. Members listen to each other. They don't jump from one topic to another, yet they are not afraid of making outlandish suggestions. The team copes with disagreements and does not seek to avoid conflicts. Disagreements are neither passed over in silence nor eliminated. The team seeks to resolve disagreement rather than suppress those disagree.

Decisions are reached by a consensus which must be large enough to be considered acceptable as a team decision. Teams rarely use a formal vote. Criticism is frequent, frank, and spontaneous. It does not take the form of either open or veiled personal attack. Team members are free to examine their own feelings and ideas on problems or about team activity. The person who directs the discussion does not use his or her authority to squash the team, and the team does not allow him or her too much authority. Power struggles are rare. The problem at hand is knowing how the work is to be done rather than knowing who is in command.

Groups whose members have no experience in teamwork are often ineffective, and for them team building is an excellent apprenticeship tool. It is formal means of making team members communicate about the way they interest as a team as well as about the tasks to be accomplished. People often fine this apprenticeship stage difficult because, ordinarily, they would rarely be asked to express what they like or dislike about their interactions with their superiors or equals. Nevertheless, this type of apprenticeship is invaluable in situations fraught with latent tension or open conflict, because these are situations that lead to loss of human potential (in the guise of resignations, inhibition of creativity , lack of collaboration, and their interdepartmental or interpersonal rivalry) and are clearly obstacles to be circumvented on the path to total quality.

4.25 INTRODUCTION OF SQC AND SPC

The techniques of Statistical Quality Control (SQO) and Statistical Process Control (SPC) have been in existence since the end of the 1920s; they are thus not a1990s innovation. Though they were developed in the United States, it was the spectacular invasion of Japanese products

After the oil crises of the 1970s, that awoke the importance of those techniques. A number of companies who recently introduced statistical quality control and especially statistical process control have been most disappointed by the results. We must not forget that statistics being but one of them.

As with any other techniques, there are conditions requisite to obtain the best result when SQC and SPC are introduced. Top management must realize that SPC is only a part of SQC; SQC is only one aspect of control; control is only one activity within quality management and finally, quality management itself must be part and parcel of the enterprise's overall philosophy on total quality management. In this way, quality management is not limited to the technical aspects of the products or processes but rather starts from the definition of the need and extends right up to the satisfaction of this need with all of the functions in the enterprise contributing to it either directly or indirectly.

This in no way means that the company has to be completely who have launched SPC and SQC programs are due, in the majority of cases, to the fact that these programs have been left exclusive in the hands of middle managers. Top management thinks that its only role is to approve budgets for the program. The workers suspect that top management uses the programs as a means to make them work harder and to save on salaries for inspectors. Everybody's attention is caught up in the means rather than being focused on the end, the company's common goals of survival and progress. The time when soldiers fought simply because the general told them to has gone; nowadays they want to know why and against whom they have to fight. There-fore, in my opinion, before introducing SQC programs, there must be a systematic effort to make everyone fully aware of their usefulness and, indeed, necessity if company progress is to be furthered and jobs protected. This sensitization program must include top management, starting with the president and upper management, and permeate down to the shop-floor workers. It is the only guarantee of success in the short and medium term and of tangible and significant results in quality improvement.

Statistical process Control

To define SPC, we should remember that control is a quantitative or qualitative evaluation of a characteristic or group of characteristic of a product (goods or services) in related to an established value which is desired or required. Statistics is a science that collects. analyzes, represents, and interprets quantitative data.

A process is a system composed of operators, machines, work methods, materials, and their immediate environment. It is used to transform input into useful output.

More and more, manufacturing companies-small, medium, or large-are introducing SPC. They do so either by choice, with a view to improving the quality of their products, or by necessity, to comply with their client companies' requirements. Indeed, many companies who outsource most of their production activities to suppliers stipulate that the suppliers use SPC as a condition of doing business with them.

The following is a list of servant of the characteristics and advantage of SPC.

1. It facilities improvement in the quality of the products and consequently increases the companies competitiveness.
2. It focuses on defect - prevention rather than on defection. This contract with control by sampling, which as an after - the - fact control, serves only to confirm a situation that already exists.
3. It eliminates, or at least reduces, emotional discussions about the process because work is done on the basis of fact rather the opinion.
4. It allows an objective education of the capacity of a process to produce results that fall within a specified range of tolerances.
5. It gives the customer the assurance - some would say proof - that the quality of the product he or she is ordering will satisfy all of his or her requirements.
6. It is a tool that permits the operator to visually monitor quality as it is being manufactured; hence he or she can make any necessary corrections when required.
7. It permits an evaluation of the impact of a change in the process on the quality of the finished product.

Big companies that require their suppliers to use an SPC system also

offer them courses inSPC, if they so desire. So that they will be able to meet the required specifications. In this way, the client company makes sure that it receives quality products and, in addition, is no longer obligated to set up a rigorous incoming control system on its own premises, as has been the case until quite recently. This is saves precious time and money that would have been spent on returning to the supplier all of the items hugged to be of interior quality.

There is another point to bear in mind; With the knowledge that no process - however sophisticated it might be - can reproduce a given dimenssation with absolute precision, the potential purchaser of a part of product indicated a range of tolerance that he or she would accept. In other words, he or she indicates what degree of deviation from the required specification, or normal alienist admissible. Unfortunately, this has given birth to a sloppy habit in industry. Manufactures no longer target the desired specification ,but remain content with failing somewhere within the permitted range of tolerance.Tolrence are confused with the quality level sought, as represented by the value specified. However, as the word itself denotes, tolerences refer to inferior quality by the value specified. However as the word denotes, tolerances refer to inferior quality which, at best, is only to be tolerated not set up as a target to aim for. To produce products that are as near as possible to the domination requires or desired, one has to use certain techniques, among the most efficient of which is SPC: SPC has the additional advantage of being a motivation once for the operators who are trained to use it. They are given responsibility for the quality of their own product and the tool with which to achieve it. Everybody wins. The company can offer betteluality at a better price and there by increases its profits, the operator is proud of what he or she produces and above all the else, the customer's needs are fulfilled.

The Basic Concept of SPC:

The basic concept of SPC is that every process, however precise it may be, produces variations. Some variations are inherent in the process and are due to random, non -assignable causes. To illustrate the point, ask someone to write the letter a several times on a sheet of paper, with the same pencil, under the same lighting and the same ambient condition. You will see that ence may be only very slight. Inherent variations of a process may be caused by vibrations from a machine, or other ambient conditions. Whereas inherent variations are random and due to change, other variations are due to assignable cause which have to be researched and eliminated where necessary. When

a process products variations due to assignable cause, it is said to be out of control. These variations can be caused by wear in a tool, machinery that is out of border, operator negligence, poor raw materials, or a power failure.

SPC's basic tool is the control charts are used to monitor a process in order to reduce the variations and limit them to those produced by non-assignable causes, thereby keeping this process under control. SPC is also useful in measuring the capability of a process to meet the specified tolerance for product characteristics.

Every process has a number of variable characteristic, such as the speed of the machines, ambient temperature weight or composition of the raw materials, and so on. Variations in these characteristics can influence the output of the process and can be due to assignable or no assignable causes within the process. You can follow the variations in any process with the aid of a control chart.

Just as a car must be smaller than a garage door to be able to fit the garage, so the span of variations produced by a process must be smaller than the specified tolerance range for a process to be capable of complying with it. This ability to fin in is called the process capability. If the span in wider than the tolerance range, the process obviously does not have the process capability needed to meet the specifications. In this case, one must change the range of tolerance, change the process, or simply tolerance the production of a certain proportion of defective units. SPC gives an objective measurement of the capability of a process. Though control charts are the principal tool of SPC, other techniques can be used, such as pareto analysis for problem identification, solving, and prevention.

STANDARDIZATION

Standardization helps reduce inventories and costs, allow interchangeability, promotes safety and quality in general, and facilitates the relations between buyers and suppliers. Moreover, in the field of quality systems that the suppliers have to set up in order to assure the buyers that they will get the required level of quality. This section deals with standardization, how it is defined, what its advantages are, and the way standards are developed and used.

Standardization, an important fact of total quality management, provides companies with the potential to markedly improve quality and enhance productivity. In our everyday lives, we are surrounded by an intricate thatch work of standards and norms. The roofs over heads and the

Walls around us are help up by beams of standard width and thickness. We are clothed from head to foot in garments of standards sizes. History first measuring instruments were undoubtedly hands or feet, but because not all hands and feet are the same size. A suitable common measure, such as the tribal leader's hand, had to be used undoubtedly, the leader was not always there when measurement was called for, so the members of the tribe may have scratched the size of his or her hand on a flat stone and placed it in a central position for everyone's use. Later, these marks were transposed onto a stick to measure objects farther away from the stone.

For a long time, the purpose of standardization was simply to make the replacement of worm-out parts easier, but its uses today go far beyond that and have spread to many new domains, to front line technologies or lot developing branches of activity where there is often much at stake in the economic sense for example, in the information superhighway, new energies, or agribusiness. The underlying intent of standardization is to standardize products or parts according to their characteristics (weight, size, dimensions chemical composition) to facilitate production, use, and marketing. Thus, anut made by one manufacturer will fit a bolt made by another. Automobile manufactures and tire manufactures use common standards. Just as the clothing industry uses standard sizes for their off the rack merchandise.

The main purpose of standardization is to increase the usefulness of safety of a product the standard thickness of the insulation in walls is calculated to reduce energy loss. Car manufacturing standards were developed to reduce gas consumption and pollution and to increase public safety. Standardization can also affect manufacturing procedures. IN the food and pharmaceutical industries, hygiene standards (to eliminate the possibility of product contamination) imposed on manufacturers become regulations and act as the safeguard for public health protection standardization plays an ever-increased role in areas that are vital to society, such as health, energy transportation and environmental protection.

Common standards for measuring and expressing time, linear dimension, weight, and energy have been hall marks of cultural achievement throughout recorded history. IN the present century, common standards for ensuring quality, compatibility safety and reliability are the logical consequence of continuing industrial and social development. Standardization is both the process of coming to an agreement on common solutions to recurring technical prob-

lems and the results of having put those agreements into practices. The process and the practice are inseparable and dynamic, as are the technical societies they serve.

ortance of internationally agree-upon standards for transport vehicles and cargo containers. For storage and handling requirements of perishable products: and for compatible universal facilities and administrative procedures to case the movement of goods. People, and services internationally. Equally important to the smooth functioning of trade are internationally sanctioned standards for specifying and testing traded products-standards such as those grading rubber, for testing the safety of gas cylinders, or fo achieveing interchnagebility of components for machine tools and earth-moving machinery.

Standardization has become an important tool for reducing the risk of injury in the home, at work and during travel and leisure activities. International standards relating to workplace safety include provisions to protect operators of industrial machinery, procedures for the safe handling of hazardous materials, specifications for the design and performance of protective clothing, and requirement for colors and symbols for safety signs and warnings. Minimizing the risk of human inquiry in automobiles and aircraft has meant requirement the use of several hundred standards covering safety glass, seat belts, lightning and braking systems, signaling devices, and exhaust systems. The development of international agreements on safety standards and regulations has been especially important for international trade in automative products.

In the home, standards provide for the safe installation and operation of household equipment, for the reliable performance of fire protection and alarm systems, for the appropriate use of glass and other building materials, and for the general safety of children's toys. Internationally agreed-upon standards can also significantly reduce the risk of injury in sports and recreational activity as in the case of the safety requirements specified for gymnastic and skilling equipment.

The procedures used for coming to agreement on standards, whether within a company at the national level, or internationally, are essentially similar. Difference mainly reflect the extent of application intended for the standards under consideration. The guiding principle in each case is that standards should be prepared and agreed upon by those who will use them and those who will be affecied by their use.

4.26 ANSWERS TO CHECK YOUR PROGRESS

1. Because out of men, material and money required for an organization, humans are the potential source , where they have the intellectual capacity and decision making ability, which is utilized for spotting out the errors and thus enables a better quality management service.
2. Performance appraisal can be done for the evaluation of the work done, as to motivate the employees based on their performance and skill sets, to enrich a work.
3. Reduction of snags or defects , non performance in complaints, Sub standard bought - out materials or suppliers. Elimination of delays in inspections and testing. Training and upgrading of operative skills.
4. There shall be a TQM committee with the BG head as its chairman and the unit GMS and the other Divisional Chief as members. The chairman may co-opt more members as deems fit. The GGM. gm (TQM coordination)shall be is member secretary.
5. The sequence of events starting from the product development. which passes through the growth, development, maturation. saturation and decline is referred as the total business cycle.

4.27 REVIEW QUESTIONS

1. Training is needed for Quality improvement, Comment.
2. What are the factors considered for framing TQM policy in an organization
3. Explain the role of Quality committee
4. What is corporate team.
5. Define cost of Quality
6. Write a note on JIT and 5S concept.

NOTES

BENCHMARKING

UNIT STRUCTURE

5.1 The Evolution Of Benchmarking
5.2 The Essence Of Benchmarking
5.3 The Benefits Of Benchmarking
5.4 Operational Benchmarking
5.5 The Benchmarking Process
5.6 Answers to Check Your Progress
5.7 Review Questions

Introduction

Bench marking is a way to go backstage and watch another company's performance from the wings, where all the stage tricks and hurried realignments are visible. - Wall Street Journal

UNIT OBJECTIVES

The essence of benchmarking is the continuous process of comparing a dompany's strat-egy, products, and processes with those of world leaders and best-in-class organizations in order to learn how they achieved excellence, and then setting out to match and even surpass it. For many companies, benchmarking has become a key component of their TQM programs. The justification lies partly in the question: "Why re-invent the wheel if I can learn from someone who has already done it?" C. Jackson Grayson, Jr., chairman of the Houston-based American Produc-tivity and Quality Center, which offers training in benchmarking and consulting services, reports an incredible amount of interest in benchmarking. Some of that interest may be explained by the criteria for the Malcolm Baldrige Award, which includes "competitive comparisons and bench-marks."

> *Check your Progress*
> 1. Define: Benchmarking
> 2. Outline the benchmarking process

5.1 THE EVOLUTION OF BENCHMARKING

The method may have evolved in the 1950s, when W. Edwards Deming taught therJapa-nese the idea of quality control, Other American management innovations followed. However, the method was rarely used in the United States until the early 1980s, when IBM, Motgrola, and Xerox became the pioneers.

The latter company became the best-known example of the use of benchmarking.

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XEROX

The company invented the photocopier in 1959 and maintained a virtual monopoly for many year thereafter. LikeCoke" or "Kleenex," "Xerox" became a generic name for all photocopiers. By 1981, however, the company's market share shrank to 35 percent as IBM and Kodak developed high-end machines and Cannon, Ricoh, and Savin dominated the low-end segment of the market. The Xerox vice president of copier manufacturing remarked: "We were horrified to find that the Japanese were selling their machines at what it cost us to Make ours.. .we had been benchmarking against ourselves. We weren't looking outside." The company was suffering from the "not. invented here" syndrome, as Xerox managers did not want to admit that they were not the best.

The company instituted the benchmarking process, but it met with resistance at first. People did not believe that someone else could do it better. When faced with the facts, reaction went from denial to dismay to frustration and finally to action. Once the process began, the company benchmarked virtually every function. and task for productivity, cost, and quality. Comparisons were made for companies both in and outside the industry. For example. the distribution function was compared to L.L. Bean, the Freeport, Maine catalog seller of outdoor equipment and clothing and everyone's model of distribution effectiveness.

Check your Progress

3. How Xerox corp. followed the benchmarking?

By the company's own admission, it would probably not be in the copier business today if it were not for benchmarking. Results were dramatic:

- o Suppliers were reduced from 500010 300.
- o "Concurrent engineering" was practiced. Each product deverognient group has input from design, manufacturing, and service from the initial stages of the project
- o Commonality of parts increased from about 20 percent to 60 to 70 percent.
- o Hierarchical organization structure was reduced, and the use of cross-functional 'Teams Xerox" was established.
- o Results included:
- o Quality problems cut by two-Thirds
- o Manufacturing costs out in half

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Development time cut by two-thirds

Direct labor cut by 50 percent and corporate staff cut by 35 percent While increasing volume

It should be noted that all of these improvements were not the direct result of benchmarking What happened at Xerox (and what happens at most companies) is that in adopting the process. the climate for change and continuous improvement followed as a natural result In other words, benchmarking can be a very good intervention technique for positive change.

FORD

The entire automobile industry may have undergone substantial change-as a result of Ford's Taurus and Sable model cars. Operating performance and reliability were significantly improved, and the gains were recognized by U.S. car buyers as well as others in the industry, "Team Taurus," a cross-functional group of employees, was empowered to bring the car to market and was given considerable authority to act outside of the normal Company bureaucracy.

The team defined 400 different areas that were considered important lathe success of a Mid-size car. A best-in-class competition was chosen for each area. Fifty different mid-sized car models were chosen. Few were Ford models. Based on the 400 benchmarks: specific teams were assigned responsibility to meet or beat the best-in-class for each area of performance,-and 300 features were "copied' and, incorporated into the car design. Target dates were set for beating the remaining features. "Quality Is ',lob One" became the fight song for Ford employees:

The Taurus was, and is, a resounding success. Some auto analysts credit the Taurus experience wi-'tti the partial resurgence of quality in the Llitautomobile.industry. The benchmarking process provided additional benefits. During the examination' of competitors' featutes,'Valuable insights int0e. design process were gained. Cycle time Was reduced. BUyer-supplier relationship was improved as supplier input was solicited for the design. Al; manuf adttlfing processes were improved as a by-product of the benchmarking process.'

MOTOROLA

In the early 1980s, the company set a goal of improving a set of basic quality attributes tenfold in five years. Based on internal benchmarking, the goal was reached in three years The company then began to look outside, sending teams to visit competitor plants in Japan To thew chagrin. the teams

found that Motorola would have to improve its tenfold improvement level another two to three times just to match the competition.

Borrowing process benchmarks from companies as diverse as Wal-Mart, Benetton, and Domino's Pizza, the company now routinely fields benchmarking requests from those same Japa-nese companies it toured the first time around.

5.2 THE ESSENCE OF BENCHMARKING

The process is more than a means of gathers data on how well a company performs against others both in and outside the industry. It is a method of identifying new ideas and new ways of improving processes and hence meeting customer expectations. Cycle time reduction and cost cutting are but two process improvements that can result. The ultimate objective is process improvement that meets the attributes of customer expectation. This improvement, of course, should meet both strategic and operational needs.

A properly designed and implemented benchmarking program will take a total system ap-proach by examining the company's 'role in the supply chain, looking upstream at the suppliers and downstream at distribution channels. How competitive are suppliers in the world market and how well are they integrated into the company's own core business processes-product design, demand forecasting, product planning, and other fulfillment.

BENCHMARKING AND THE BOTTOM LINE

There are two basic points of view regarding how to get started in benchmarking. One minority view maintains that an initial action plan that tries to match the techniques used by world- class performance may actually make things worse by doing too much too soon. A three-year stud9 of 580 global companies conducted by the management consulting firm Ernst & Young concluded that it may be best to start measuring existing financial performance measures. Two key measures are return on assets (which is simply after tax income divided by total assets) and value per employee. Value added is sales minus the costs of materials, supplies, and work done by outside contractors. Labor and administrative costs are not subtracted from sales to arrive at value added.

The focus on financial results is not recommended by the majority of executives familiar with the benefits of benchmarking. Some believe that it is easy to be fooled by financial indicators that lull the company into thinking that it is doing well when what in reality occurs is a transitory financial phenomenon that may not hold up over the longer term. A more important payoff is quality processes that lead to a quality product.

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Robert C. Camp headed up the now-famous study at Xerox in which the buzzword "benchmarking" was coined in 1980. When asked whether the best work practices necessarily improve the bottom line, he replied: "The definition of benchmarking is finding and implementing best practices in our business, practices that meet customer requirements. So the fly wheel on finding the very best is, 'Does this meet customer requirements?' there is a cost of quality that exceeds customer requirements. The basic objective is satisfying the customer, so that is the limiter

5.3 THE BENEFITS OF BENCHMARKING

Given the considerable effort and expense required for effective benchmarking, why would an organization embark on such an effort? The answer is justified by three sets of benefits.

Cultural Change

Benchmarking allows organizations to set realistic, rigorous new performance targets, and this process helps convince people of the credibility of these targets. This tends to overcome the "not invented here" syndrome and the "we're different" justification. for the status quo. The emphasis on looking to other companies for ideas and solutions is antithetical to the traditional U.S. business culture of individualism. Robert Camp, the former Xerox guru quoted earlier, indicates that the most difficult part for a company that is starting the process is getting people to understand that there may be people out there who do things better than they do. According to Camp, overcoming that myopia is extremely important.

Check your Progress

4. What are key performance variables?

Performance Improvement

Benchmarking allows the organization to define specific gaps in performance and to select the processes to improve. It provides a vehicle whereby products and services are redesigned to achieve outcomes that meet or exceed customer expectations. The gaps in performance that are discovered can provide objectives and action plans for improvement at all levels of the organization and promote improved performance for individual and group participants.

Human Resources

Benchmarking provides a basis for training Employees begin to see the gap between what they are doing and what best-in-class are doing. Closing the gap points out the need for personnel to be involved in techniques of problem solving and process improvement. Moreover.. the synergy between organization activities is improved through cross-functional cooperation.

STRATEGIC BENCHMARKING

It is paradoxical that two AT&T divisions (AT&T Network Systems Group. Transmission Systems Business Unit, and AT&T Universal Card Services) were 1992 winners of the Baldrige Award Like several other winners, the company has turned this win into an advantage and orga-nized a separate operation to market this expertise. Training is the product offered by the AT&T Benchmarking Group of Warren, New Jersey. The process is illustrated in Figure 8-1

The paradox is that ten years after losing billions of dollars, the company was still trying to be a significant player in the market. The near disaster could be traced directly to the company's failure to (a) realize that the key success factors in the industry included sales, distribution, and service (functions that AT&T had very little experience in) and (b) conduct strategic benchmarking against such best-in-class competitors as IBM and Compaq. Moreover, the company apparently failed to define its market segment, the criteria used for customer purchasing decisions. and how the company's product could be differentiated inthe chosen segment. If, tor example. IBM. Compaq or AT&T wanted to benchmark against such best-in-class competitors as IBM and Compaq. More. over, the company apparently failed to define its market segment. the criteria used for customer purchasing decisions, and how the company's product could be differentiated in the chosen segment If, for example, IBM. Compaq, or AT&T wanted to benchmark NCR, they would find that NCR has gone to great expense to define the criteria of product quality as "usability. aesthetics, reliability. functionality. innovation and appropriateness."

One way to determine how will you are prepared to compete in a segment and to help define a best-in-class competitor is to construct a key success factor (KSF) matrix similar to the one shown in Figure 8-2. Following this determination. a matrix such as the hypothetical one shown in Figure 8-3 can be constructed to measure market differentiation criteria against competitors. Note that the criteria for comparison are based on the 'customer's purchase decision This type of strategic analysis can be followed by one involving specific processes-operationai benchmarking. Strategy drives performance and hence quality. Indeed, quality can and should become the central theme of strategy. Note that Figures 8-2 and 8:3 can be used to benchmark best-in-class outside the industry.

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5.4 OPERATIONAL BENCHMARKING

-This category focuses on a particular activity within a company's functional operations ana then identifies ways to emulate or improve on the practices of best-in:class. Whereas strategic benchmarking is largely concerned with the macro analysis of the environment, the industry, and the competitors, operational benchmarking is more detailed in terms of data gathering and the rigor of the analysis. Most of the focus is on cost and differentiation. Because the customer's purchasing decision (PD) is a function of price and differentiation, it is necessary to differentiate through quality [PD = f (P x Q)) and improve price through cost reduction. Both lead to an analysis of the cost and activity chains of interconnected processes.

The scope of benchmarking extends to both strategic and operational processes. The scope of these two categories of benchmarking at Westinghouse (a Baldrige winner) is displayed in Table 8-1.

5.5 THE BENCHMARKING PROCESS

There is no standard or commonly accepted approach to the benchmarking process Each consulting group and each company uses its own method. Whatever method is used, the major steps involve

1. Measuring the performance of best-in-class relative to critical performance variables
2. Determining how the levels of performance are achieved
3. Using the information to develop and implement a plan for improvement. These steps are discussed in further detail in the following sections.

> *Check your Progress*
>
> 5. List out some corporate who followed benchmarking .

Determine the Functions I Processes to Benchmark

Those functions or processes that will benefit themost should be targeted for benchmarking. It is wise to choose those that absorb the highest percent of cost and contribute the greatest role in differentiation, always thinking in terms of process improvements that will have a positive impact on the customer's purchasing decision. Because no company can excel at everything, it is rine ssky to delineate targets Berichmarking "manufacturing." for example, is much too broad and the subject is too ill-defined. If the elements to be benchmarked cannot be-framed, data gathering is not focused and subsequent actions may be destructive

Many companies focus their efforts on iirOduct companies. In manufacturing industries this may mean product tear-downs (e.g., Ford, Xerox) and

re-engineering of design standards and assembly processes. This approach should take second place to improving time to market. first- time quality of design, and design for purchasing effectiveness, which are the primary drivers of both quality and cost. Of course, these actions should be undertaken after customer satisfaction has been defined with customer input.

The health care industry provides an example of the potential for cost and quality improvement. For one procedures alone, coronary artery bypass grafts (CABG s, DRG s 106-7), Americans paid for more than 130,000 in 1991. Of the patients treated, 6,033 died. Ancillary charges alone reached $2.67 billion. Baxter Healthcare Corporation of Deerfield, Illinois, which benchmarked CABG s in ten hospitals, calculated that $1.57 billion in ancillary charges alone could be saved if all hospitals benchmarked the processes of the benchmarked ten.

Select Key Performance Variables

Functions, activities, and processes can be measured in terms of specific output mea-sures of operations and performance. In general, these measures fall into four broad categories

Cost and productivity, such as overhead costs and labor efficiency. Total dollars per unit or per ton is a starting point in manufacturing. Other variables might include production yield of raw material, direct labor per unit produced, etc.. Unless the project team begins with total costs before it breaks them down by process or activity, some very important overhead charges may be neglected when benchmarked against firms with different accounting systems. See Chapter 10 (Productivity and Quality) for additional measures.

Comparing one company's financial statements and cost breakdowns against those of another would be a good method for a "me-too" strategy if access were available to the detailed statements of a competitor or the best-in-class and if they were based on similar accounting methodology. These are two big "if's." A better way is to identify the underlying cost drivers of the many functions and activities that, when combined, make up total costs. For example, raw material costs may be driven by sales, purchase volume, source, or freight: direct labor by wage and benefit rates, skilled vs. unskilled, or union vs. non-union: indirect labor by the ratio of direct to indirect, salary levels, and so on.

A team at Mercy Hospital in San Diego decided to benchmark medical records because the activity represented the largest portion of clinical support. The team left a benchmarking visit to a sister hospital empty-handed because they found that the two hospitals were quite different in

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This activity. A team member commented: They weren't equivalent to us at all. It didn't do the functions we did, it wasn't open 24 hours a day like us, and it was more decentralized-a lot of what we do, they do in various other departments and clinics".

Timeliness. Often overlooked, timeliness is a major factor in internal processes as well as customer satisfaction. The measure is frequently expressed in cycle time or turnaround time such as time to fill an order or time to answer the phone. Some manufacturing executives have been known to visit automobile races to measure pit stops as benchmarks for set-up time or line changeover time.

Differentiation and quality. Measures of differentiation and quality are needed for both processes and product. Quality measures should capture the errors, defects, and waste attributable loan entire process and express them relative to the total output achieved. Defects tend to cascade down a chain of processes, becoming increasingly expensive to correct.

Differentiation and quality of product are essentially the same, because quality is what differentiates a product The variables should include any factors that affetts a customer's pur-chasing decision (see, for example, Figure 8-3).

Business processes. These are the processes not directly related to product design, production, sales, and service They include the many staff and internal service activities that are costed under general and administrative (GM) expense. One has only to look at the organizational chart to identify areas for cost reduction and for improvement of productivity and quality. Human resources, data processing, accounts receivable, marketing services, maintenance, security, data center, warehousing, public relations... the list gone on. Many companies have had severe cash flow and profit problems due to a failure to control the cost and output of these business or support processes. Whereas direct labor and material costs may make up the largest segment of total costs in a manufacturing and more difficult to measure: however, they represent fertile ground for improvement. Another area is internal quality and internal customers. A good place to start may be to use the techniques of activity analysis and activity-based costing

IDENTIFY THE BEST-IN-CLASS

This is a major step in the benchmark analysis. The objective is to identify companies whose operations are superior, the so-called best-in-class, so that the company's own operations can be targeted.

The quickest way to identify excellent performers is simply to visit some companies that have won the Baldrige Award.. A lot could be learned in a hurry, but these companies may not have the time or may not have similar processes. Other source include

1. Available databases
2 Sharing agreements between companies
3. Out-of-industry companies.

Databases are an expanding source of comparison information The most current and most comprehensive of these is maintained by the Houston-based Amerincan Productivity &Quality

5.6 ANSWERS TO CHECK YOUR PROGRESS

1) Bench marking is a way to go backstage and watch another company's performance from the wings, where all the stage tricks and hurried re-alignments are visible

2) Measuring the performance of best-in-class relative to critical performance variables

   Determining how the levels of performance are achieved, -Using the information to develop and implement a plan for improvement

3) The company instituted the benchmarking process, but it met with resistance at first. People did not believe that someone else could do it better. When faced with the facts, reaction went from denial to dismay to frustration and finally to action. Once the process began, the company benchmarked virtually every function, and task for productivity, cost, and quality. Comparisons were made for companies both in and outside the industry

4) These are the essential parameters which are required to measure the benchmarking process. Such parameters mav include time, quality, consistency and speed.

5) Xerox, Ford, IBM etc.,

5.7 REVIEW QUESTIONS

1. What are the benefits of Benchmarking?
2. Explain the process of Benchmarking?
3. What is operational Benchmarking?

NOTES

ORGANISING FOR TQM

UNIT STRUCTURE

6.1 Organising For Tqm
6.2 Roles in Organizational Transition to Tqm
6.3 Small Groups And Employee Involvement:
6.4 What is ISO 9000?
6.5 Quality for Profit:
6.6 Acceptable Quality Levels:
6.7 Ownership And Elements Of Self-Management:
6.8 The Quality Delivery Process:
6.9 Answers to Check Your Progress
6.10 Review Questions

UNIT OBJECTIVES

1. To understand the Organising for TQM, Roles,
2. To learn the What is ISO 9000 and certificate
3. To understand the Recognition and Rewards, Quality delivery process
4. To understand the Quality measurements

6.1 ORGANISING FOR TQM

Many ask themselves what is the relationship between the ISO 9000 series and total quantity. The EU's insistence on compliance with these standards as a condition of doing business within or with the EU has started a widespread movement in which companies all over the world are racing to apply these standards and, often, to obtain certification or registration by recognized national oranizations. Many ads and much publicity are developed to the fact that such and such company has made the grade and become ISO 9000 registrered. Besides the fact that htse standards are becomgin a must for both world trade and for domestic business, many companies, having tired to implement TQM, find it much easier to aim for an ISO 9000 status.

TQM is a management p[hilosophy that is defined differently from one autho to the next form one consultant to the next. This posses a problem for companies that embark on such a venture without being sure that it is actually in line with their goals. The ISO 900 standards, how ever, do not change from one company to the other or from one consultant to the next. Quite the contrary, ISO 9000 is a gude that clearly specifies the characteristic of a quality system and thus provides a sense of security to tis users. Besides, the fact that these standards have been devel. Oped by a prestigious, international standardization body with representatives from almost 100 countries and given the seal of approval by the mighty EU increases their credibility tremendously. They are not simply the work of one guru or theproduct of one expert's thinking.

These facts may seems as reassuring as a warm bath-in contrast with with the cold shower of TQM. However as James coorrigan puts its"ISO 9000 doesnot have a sufficient customer focus, doesnot address how good a product or service is .... Doesno't call form ongoing evaluation and improvement of the quality system elements.'TQM of course, does, what it does not do, on the other hand, is provide a mechanism to ensure that the system is effective and is being followed. As Corrigan points out, TQM takes the existence of such a system, and the company's compliance to it, as given, That, however, is not always the case: and this precisely where ISO 9000 "Any organization starting a TQM effort should assess the adequacy of its underlying quality system...... Using an ISO 9000 standard for this assessment would provide excellent measurement criterial and a structured approach to periodic evaluation of the quality system.

Check your Progress

1. What is the relevance of implementing ISO certification?

Although the ISO 9000 standards, or any other quality management and assurance standards for that matter, are important to achievement of quality, they are not a guarantee that quality, let alone total quality, will indeed be achieved. This can be illustrated by using the analogy, albeit imperfect, of traffic regulations. Of course, with no traffic regulations, chaos would probably result, but on the other hand, the fact we have a well-thougth-out code as well as a stron police force to back it up and to make sure, it is applied does not mean that is being followed as in detector industry. Some people even take pride in beating the system without being caught.

Another aspect to knowledge is fact that although ISO 9000 speaks of customer requirement. It really focuses almost eclusively on the quality of products and services produced on the Q rather than on the Vality. And even this

is carried out in oblique fashion. For although ISO 9000's ultimate aim may be product quality. It never examines the product or service itself, only the system that prdocues tha product of service. This is not to minimize the importance of quality which is of the utmost importance. However, it is also an area that generally leaves less room for improvement than other areas, because quality has taken great strides forward all over the world since the early 1970s with the oil crises and subsequent economic recessions. Now customers are demanding most than that: better delivery times: lower prices: less coumbersome relations with a company, its personnel, and its representatives: smplified terms and procedures of purchase (ordering, credit evaluation) and of payament, and better accessibility to product and services. Even if some of these aspects are indeed mentioned, no ISO 9000 standard goes so far as to spell out and integrate them.

If an ISO 9000 standard is to be used successfully, it has to be part of a more global approach. it cannot replace TQM, nor can it achieve total quality. It is tool. and good one at that but still a tool among many others. While not an end in itself, an ISO 9000 stnadard goes so far as to spll out and integrate them.

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Customers, channels, and suppliers also have value chains, and the firm's output of prod... uct or service becomes an input to the customer's value chain. The firm's differentiation and its competitive advantage dei3end on how the activities in its value relate chain relate to the needs oc the customer, channel, or supplier. If quality has been chosen as a competitive advantage, it now - remains to determine the customer's system. Following this determination, the value chain should be organized into the required discrete activities, each one of which can improve the quality of the output for the purpose of meeting the customer's expectations. Before, asking what you can do the customer, ask what the customer expects to accomplish. The answer forms the basis for - quality organization: 10 this isobar's.; it Should be kepi- in Mind that there are linkage's between firm's value chain and those of its customers, as well as downstream linkages with channels art suppliers. An excellent example of this is Wal-Mart, where a key competitive advantages was achieved

ough the value chain activity of technology development; in Wal-Mart's case, was the sophisticated computer-based information system that improved the output of many other-9' activities such as distribution, purchasing, and warehousing.

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THE PEOPLE DilMENSION MAKING THE TRAVSMON. FROM A Traditional TO A

6.1.1 TQM ORGANIZATION-

The typical company operates with a vertical, functional organizational structure based reporting relationships, budgeting procedures, and Specific and detailed job, classifications. Departmentation is by function; and communication, rewards, and loyalties: are functionally oriented Processes are forced tt) flow verticallv from the top down, creating costly berries to process flow. The systems aonroach to organizing suggests three significant changes, one conceptual at the and two requiring organizational realignment :

- The concept of the inverted organizational chart
- A system of intra-company internal quality
- Horizontal and vertical integration of functions and activities

The inverted Organizational Chart

If you've seen them all: the symmetrical pyramid with the chairman at the cascading of authority to successive levels (fourteen at General Motors) until the functions are shown near the bottom of the chart. Front-line supervisors are rarely shown and non-supervisory personnel almost never appear.

Check your Progress

2. What do you know by tqm organization?

Where are the front-line supervisor and the employees? These are the people who deliver quails to the customerAhlthe eyes of the customer, they are the company. The sports fan cares not for the owner or the manager The players deliver the quality. And so it is with the flight attendant:. the bank teller, the auto. meci-.1anic, the sales person explaining a product, the person answering the telephone... even the college professor. Perhaps it is time to put first things first, To make the transition from traditional to TOM management, it may be desirable to conceptualize a new organization chart. Invert the existing one and put the customer at the top, followed by the employees and front-line supervisors. These are the delivers of quality. This concept does not change the hierarchy and flow of authority, but the boss is no longer the boss in the old-fashioned sense. He or she is now a facilitator, a coach, and an integrator, whose job is to remove barriers that prevent subordinates from doing their jobs. The same role now falls on middle and top management. Quality is now the responsibility of everyone and not just the quality assurance department.

Internal Quality:

The Juran Institute of Wilton, Connecticut delivers a program called "Managing Business Process Quality," which is a technique for executing cross-functionarquality improvement among intra-company functions and activities. A key factor in this approach is an organization-wide focus On the customer, including both internal and external customers. An enlarged definition of quality should be used to embrace all business process, rather than just manufacturing.

The systems approach, by definition requires the integration of organizational activities for achievement of a common goal. This goal, under the TOM fort of organization, remains the satisfaction of customer requirements, but customers .ate now considered to be both outside as vied as within the organization. The process applies whether relating. to-a. Final. customer an - internal customer, it is participative process initialing Supplier and customer in' active dialogue. Examples include: Metropolitan Life Insurance Company has made a major commitment to improve quality by implementing a horizontal management approach that is built on management cornmik, ment, employee involvement, and knowledge of internal suppliers. Campbell USA has aimed its latest quality emphasis, its "Quality Proud" program, at the administrative and marketing activities of the company. Job descriptions, promotions, pay. and bonuses for all employees are linked to the results of the new program. As a major step in its transformation to a total quality organization, DEC asked each of its 125,000 employees to answer in writing the following questions:

1. What business process are you involved in?
2. Who are your customers (that is, the next step in the processes you are involved in)?
3. Who are your suppliers (that is, the preceding step in the processes you are involved in)?
4. Are you meeting the expectations of your expectations?
5. Are you suppliers meeting your expectations?
6. How. can the process be simplified and waste eliminated?

DEC reported that this simple survey has a massive impact.in. the short run, countless redundant activities were discovered and eliminated. Inthe long run, DEC employees now think in terms of Meeting both internal and external customer expectations. Aside from the obvious benefits of improvements in

quality productivity, and cost a System of internal customer quality is Impor-tant for a number of other reasons:

External customer satisfaction cannot increase unless internal customer satisfaction does

- No quality improvement effort can succeed without employee buy-in and proactive participation.
- Focus on internal quality promotes a quality and entrepreneurial culture.
- An understanding of internal quality policy is an aid in communication and decision Making.
- it isa significant. Criterion in the Malcolm. Baldrige National Quality Award.

6.2 ROLES IN ORGANIZA'IONAL TRANSITION TO TQM:

Members of a successful organization need a sound understanding of their roles during the transition to a TQM program.. People at-all Level Require orientation as to how they will be impacted under the new philosophy of employee involvement. The improvement process involves. a group of complementary activities that provide an environment conducive to improvement of performance for both employees and.-managers Each level has a role to play.

The role of top management is critical. Many of the most successful companies launched their programs by creating-g a quality council or steering committee whose members comprise the top management team. Some multi-division companies encourage a-council in each division or strategic business unit (SBU). The council provides a good vehicle for management to demonstrate its leadership in the quality initiative. At Motorola the CEO, who is also the Chief Quality Officer of the corporation, chairs the Operating and Policy Committee in all-day meetings twice each quarter.

Opinions differ as to who should lead or coordinate the TOM effort. One source suggests a new role similar to that of a financial controller, a role that is justified on the basis that quality is now a strategic business planning and management function. Others disagree and suggest that the company should avoid setting up a quality bureaucracy headed by a high-profile quality director There is general agreement that it should not be headed by a staff department such as personnel or quality assurance. The process should be line led and given back to the business managers who implement it on a daily basis.

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To reiterate. quality should not be led by a non-line manager. The major changes are. strategic and organizational and have been outlined in this and. previous chapters. It now remains for top management to manage the transition..

The role of middle Managers has traditionally been an integrative one. hey are the drivers of quality and the information tunnel for change both vertically and horizontally - the go-betwee for top management and front-line employees. They impleme it the strategy devised by top management by linking unit goals to strategic objectives. They develop personnel. make continuous improvement possible, and accept responsibility for performance deficiencies. .

Frontline supervision has been called the missing link in TOM At Federal Express". E3atdrige winner, the communication effort is focused on the front-line supervisors because most employees report directly to them. The company realizes that the real purveyors of quality are the employees. and a basic quality concept is candid. open. two-way communication.

Supervisors can make or break a quality improvement effort. They are called upon to pro-vide support to employee involvement teams and create a climate that builds high levels of com-rn itm e n t in groups and individuals.

Quality assurance and the quality professional are faced with good news and bad news as TQM emerges as the load - bearing concern of company strategy. On the one hand. the . accelerating emphasis on quality has given them more visibility, and in some cases the reporting relationships have moved to higher levels in the organization. On the other hand. they may now be perceived as a staff support function as quality becomes more widespread and led by line managers.

Philip Crosby indicates that the quality professional must become more knowledgeable about the process of management. The limited tools of inspection techniques and statistical pro-. gess control have become less important as the more sophisticated approaches of TOM begin to provide all functions and activities, rather than just manufacturing.:.

6.3 SMALL GROUPS AND EMPLOYEE INVOLVEMENT:

In a Harvard Business Review article, David Gum pert describes a small "microbrewery' where the head of the company attributed their success to a loyal. small. and involved work force. He found that keeping the operation small strengthened employee cohesiveness and gave them a. feeling of respon-

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sibility and pride. This anecdote tells a lot about small groups (hereafter called terms) and how they can impact motivation, productivity, and quality. If quality is the objective, -employee involvement in small groups and teams will greatly facilitate the result because of two reaSons: motivation and productivity. The theory of motivation, but not necessarily its practice, is fairly mature, and there is substantial proof that it can work. By oversimplifying a complex theory, it can be shown why team membership is an effective motivational device that can lead to improved quality. Teams improve productivity as a result of greater motivation (Table 9-2) and reduced over-lap and lack of communication in a functionally based classical structure characterized by territorial battles and parochial outlooks, There is always the danger that functional specialists, if left to their own devices, may always the danger that functional specialists, if left to their own devices, may pursue their own interests with little regard for the overall company mission. Team member-ship, particularly a cross-functional team, reduces many of these barriers and encourages an integrative systems approach to achievement of common objectives, these that are common to both the company and the team. There are many success stories, To cite a few: -

Check your Progress

3. How employees can be actively involved in quality programmes?

Team Membership and Motivation

Motivating factors Team Membership

Job development (the work)

Vertical loading	Provides responsibility
Job closure	Team members see results
Feed back	Self-established goals
Achievement	Targets set by teams
Growth / Self-development	Training, more responsibility
Recognition	By peers and supervisors
Communication	Team is vehicle for communication

* Globe Metallurgical, Inc., the first small company to win the Baldrige Award, had a 380 percent increase in productivity which was attributed primarily to self-managed work teams
* The partnering concept requires a new corporate culture of participative manage ever- 41)z ment and teamwork throughout the entire organization. Ford increases productivity 28 percent by using the team concept with the same workers and equipment.

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* Harleysville Insurance Company's Discovery program provides synergism resolk: ing from the team approach. The program produced a..Cost .saving of $3.5 million, along with enthusiasm and Involvement among employees.
* At Decision Data Computer Corporation middle management is trained to support Icing "Pride Team. .
* Martin Marietta Electronics and Missiles Group has achieved success with perfor-mance measurement teams (PMT s).
* Publishers Press has achieved significant productivity improvements and attitude since eXperi change from the company's process improvement teams (PIT s) billion;
* Florida Power & Light Company, the utility that was the first recipient of the Deming Prize, has long has quality improvement teams as a fundamental component of their quality im- Manage provement program

Check your Progress

4. What are the quality system requirements for ISO implementation?

CASE STUDY

HOW TO IMPLEMENT A QUALITY MANAGEMENT INITIATIVE

The term "quality management" has become so popular these days that we risk reducing in to a it to where the words become meaningless and Serve no useful purpose. Only' by trans- P ic€ bet lating those words into action can we use their message to help build better businesses

Three Malcolmi Baldrige National Quality Award - winning companies - Xerox.Corp., Business Products and Systems (Stamford, CT), IBM Corp.. Rochester Unit (Armonk, NY) and Fed, ether su eral Express Corp., (Memphis, TN) - successfully transformed quality management philosophiet, techno into quality management practices. The Malcolm Baldrige National Quality Award, created by Con Industry. grass in 1987, is the highest form of recognition for quality management in the United States. A Visio Named after the last secretary of Commerce, the award serves to promote quality awareness. recognize quality achievements and publicize successful quality strategies.

Here, representatives of each of these companies describe the steps they took to implement their award - winning quality initiatives.

The need for change

The first thing that has to happen is an understanding of a need for change maintains Sam Malone, project manager, corporate communication for Xerox. At Xerox. he ades major crisis - in essence we were in a going - out - of - business strategy if we cbdn't mange'

The awareness that change was needed at Xerox began the mid-70s, when a series of' events-conspired to loosen Xerox firm grip on the copier/ duplicator market. Just as aggressive Japanese companies targeted the low end of the market with small. high-quality low-priced copiers, and began to penetrate the mid-range market, Federal Trade Commission settlements required Xerox to open international access to key patents. Meanwhile Eastman Kodak (Rochester, It .) and IBM applied added pressure, entering the high end of the market.

By 1980,,increased competition began to take its toll. Xerox market share had .dropped Significantly. The resulting lower rates of return on assets threatened Xerox's ability to maintain long term business vitality. It was clear that drastic changes would be needed for Xerox to remain . competitive

In contrast, when FedEx embarked upon a quality management initiative, it began from :position of strength.. Capitalizing on the management philosophy of People, Service and Profit" Since its inception in 1973 the company had achieved high levels of Customer satisfaction and.. experienced rapid sales growth. Within ten years. the company's annual revenues topped '$1: billion; by 1990. revenues totaled nearly $7 billion. Domestic market share hit 43 percent in 1989. outstanding the nearest competitor. which held 26 percent. But those achievements were history. Managements' understanding that past accomplishments do not ensure future success fueled the drive to improve. in order to retain their market dominance.

The management of IBM didn't have to look far to find a reason to initiate a company-wide quality management initiative. Their very own IBMCV Giddappa Rochester. MN site (where intermediate computer systems and disk storage products are manufactured) had instituted quality management practices in 1981, and the results were compelling: a.30 percent improvement in productivity between 1986 and 1989: a 50+ percent reduction of product-development time for new mid-range computer systems; a 60 percent reduction in the manufacturing cycle since 1983: and impressive gains of IBM's world market share for intermediate computers achieved in 1988 and 1989, among Other successes. In Rochester. corporate headquarters had found a way to translate a formidable technology leadership into market leadership in the face of an increasingly competitive computer industry. It was time to teach the rest of the computer giant how to capitalize on quality management.

A Vision Statement:

Having made the difficult decision to embark on a quality management initiative, the companies entered the next stage of the process; formulating a clear vision of where the company will be once the quality initiative is in place. This entails, asserts Maalone, "a coalescing of the senior management around the issue that we need to change the business, and some kind of an agreement as to what that change should result in".

To accomplish this, he adds, the company needs to develop " a desired documents or vision statement that says, given we go through all this turnoil of change how will we know if its successful down the road what would we look like ? what are the key parameters ? what are the specific elements that we want to focus on for change

In most companies, if not all, the precepts of total quality management run counter to the very practices which brought success to the company and its managers in the past. Realizinig this the executives at Xerox, FedEx and IBM sought the advice of management experts to help identify those elements of change and to write a vision statement. Xerox selected an expert in organizational change and trained a group of senior executives to lead the initiative; FedEx opted for a quality consultant; and IBM found its experts among its executive ranks. Xerox decision was founded on the belief that senior executives educated in total qualify management are !better able to understand the current environment and the current ills of the organization and will be better able to design an approach to fit, than an outside quality experts says Malone. However, realizing they would need assistance, they felt the consultant would provide insights and expertise that were required to sustain a cultural change over a long period of time.

Even at the already successfully -FedEx. says John R. West, their manger of Corporate Quality Improvement. "the first step was to find some experts to lead the way". He too says looked both inside the company and at outside consultants to find the experts. But time being a factor, he

says. they opted to go Primarily outside. After initially working with-Several consultants, they chose one who among other things, provided them with a two course quality curriculum, which launched the quality process companywide.

West cautions, however, that you should take care to find a consultant whose expertise matches your company's needs as a service or manufacturing

company. "We ran into a few problems on the front end by concentrating too much on a manufacturing-type philosophy", confesses West. "We had too heavy an emphasis on statistical process control, and the turned some of our senior management off- to the extent that it took us about two years to get them interested again"

IBM found their quality experts and the marking of a vision statement at the award-winning Rochester site. Reviewing Rochester's management process, and using the Baldridge Award criteria as a guide, IBM executives identifies the aspects of the process that Made their latest intermediate computer, the AS/400, a success, and wrote those into the vision statement.

The Vision

While each of the companies' vision statement feature the quality principles that have come to be the buzzwords of quality management, they are tailored to suit the individual circum-. stances faced by each company. All of the initiatives focus on customer- satisfaction, as deter-mined by the customer, and as measured with verifiable facts. While it's impossible to discuss the intricacies of the companies' quality initiatives in this article, some main points provide insight into the more important aspects.

IBM's "Market Driven Quality" (MDQ) initiative, inspired in part by Rochester's su.aae....s focused on involving the customer more directly in the product planning and design oe:-s: before beginning the development of a new product'. say Paul Bergevin of IBM's corporal:e relations. By involving the customer at the beginning, IBM believes they will 'shorten cycle times and improve quality, which are fundamental to achieving higher levels of customer satisfactory from which everything else flows," he adds.

FedEx' new vision of a quality process, grafted onto the successful."People Service Profit" philosophy, centers upon the replacement. of the quality measurement - percent of on-time deliveries - with a 12-component indicator that describes how its performance is experienced by its customers. Each item in the indicator, called a Service Quality Indicator (SQI), is weighted to reflect the "potential adverse impact" on customer satisfaction, explains West.

Benchmarking against other world-class companies and Other measurement systems are key to visualizing the desired-state. Xerox began the quality initiative by benchmarking 14 performance elements; today they benchmark 350+ elements, taking care to analyze all this data not only "by the numbers", but also by processes.

In addition, all three companies rely on regular customer surveys to spawn new changes. Both the external customer, the purchaser of products, and the internal customer, any employee to whom another employee forwards material, are surveyed regularly to determine their constantly changing needs

CASE STUDY - 2

ORGANISING FOR TOTAL QUALITY MANAGEMENT

The need to modernize sparked this company's move to Total Quality Management. The result? Final test yield percentages in the high 90s and a significant reduction in warranty returns..

ALLEN - BRADLEY COMPANY

One of. the marks of a truly quality - minded company is that it strives foe constant improve-client. Even if things are already going well, there's no reason why an organization can't challenge itself to do even better when it comes to quality.

Many companies implement quality management systems because they need to improve quality. Unlike these companies, however. Allen - Bradly Co. (Mil-waukee,WI) found itself in the enviable spot of launching its quality system to position itself for even greater competitiveness in he future.

This manufacturer of international automation and quality management components and systems, formed in 1903, has always had a tradition of high quality because of its Old World German and Swiss culture. "The company had the Old World mentality of the value of quality,' explains Roger Hartel, vice president of Quality Assurance for the company's Industrial Computer and Communications Group (Highland Heights, OH). "As a result, it always had an enviable market position with all of its products."

Cause for Change

In the mid - 1970s, however. three important things occurred that forced the company to reevaluate the way it managed quality:

1. Management decided to move the company into the "electric age". Until that poim. all the company's products were electromechanical. Management realized that the future of tie industry would be electronic As such. the company's quality system would need to be refocused,

At the time, quality was based on a lot of inspection, testing, and re-work This worked weir because of the majority of defects in the electromechanical devices were very visual (parts out of shape, out of dimension, cracked or broken). "Quality Problems in electronic components, how: ever, are more

subtle, hidden in the software or electronic circuitry," points our Hartet.

Such problems can occur as a result of temperature changes, interactions between and among different products. and so on. "A problem might be there one minute and gone the next." he adds

Because of this, the company needed the quality system based on'prevention, rather than appraisal. simply because appraisal would be difficult; and it would certainly not be cost effective.

2. Allen - Bardley was also in the process of acquiring a number of new companies as part of its strategy to move into electronic manufacturing. But these new companies did not have the strict quality culture of the original Milwaukee facility. And when managel-rient attempted to transfer this culture to them, it met with great difficulty.

3. Part of the company's strategy in moving into electronics involved moving into the world marketplace. That meant that it had to become world-class in its operations, and, of course. dheacvaedjeusat this required, quality based on prevention, not appraised.

Early Problems

To address these challenges. Allen-Bradley implemented a Total Quality Management Systems- (TQMS). one that emphasizes continuous improvement in quality, productivity, and 6 1(satisfaction. It is based on the belief that everything can be improved and that improvement Must be continuous.

Early. efforts involved implementing many of the standard quality control systems, such' as statistical tools and training problem-solving techniques manufacturing controls and supplier management. While the efforts themselves were not difficult to implement, management met With resistance in many locations for two reasons:.

Those locations that were part of the "Milwaukee quality culture" didn't see the need new system, since their quality was already so impressive.

Those locations that were recently acquired by the company often reported that they were .too busy solving quality problems to find the time to adopt a new system.

Pressure from management to adopt the new system was one component of success, but another event spurred adoption even more: "Many of the divisions realized the need to move into a just-in-time (stockless) production system," reports Hartel. "In so doing. they quickly realized that they would

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never, be able to manage such a system without a prevention-based quality system"

In other words, there was no way to be able to predict how many individual units would have to be fed into a process in other to produce the right number of final products. in a shot-run system. "You simply cannot do JIT when you have low yields or when you handle quality by inspection and rework," emphasizes Hartel.

Teamwork: A Crucial Element:

Teamwork plays a vital role in TQM. Prior to Introduction of the system, people at Allen-Bradley performed their work to high standards, but did not necessarily do so in a spirit of information exchange and cooperation. " They lacked the awareness of what their internal .customers needed," he says. Each department, in other words, set its own standards and procedures without consulting other departments.

An important part of TQM involves turning this -mentality around to one of teamwork and cooperation. "The idea is to define how the organization as a whole wants to do business', says Hartel. The next step is to break down these goals into individual steps and elements as they affect quality and service. This requires the visible and permanent involvement of all functions. Hertel refers to the process. which addresses how each function serves and is served by all other functions, as "defining and managing inter functional deliverables and receivables". Today, the concept is often referred to as parallel engineering. Unlike other companies that have just begun to adopt this strategy, however. Allen-Bradley launched its teamwork concept a decade ago.. The Process in Action. Form the time a marketing person. has the glimmer of a product 'idea or receives a suggestion from a customer for a new product, until the product is actually manufactured and shipped. most companies allow the functions involved to operate somewhat independently of one another. Allen-Bradley insists that all the critical functions work together as a team to design. develop. and manufacture the product. Each function becomes both a customer and a supplier of the other functions. In every instance. each function considers the ramifications of its actions in all other functions. Certifiable Quality: Another critical element of TOM success is departmental certification. Each department in the company is required to determine what systems must exist in its department in order to satisfy

its part in reaching the company's overall goals. Management then audits these systems to verify that they are in place. that they are working. and that they are achieving these three goals, it is formally certified.

Each year the department must also be recertified Recertification audits ensure not only that the systems are in place. working, and achieving quality goals, but that they are improving.

"Each certifiable department must enhance its system by adding new elements to its quality activities, "emphasizes Hartel. "Status quo causes atrophy. and there is .no place for atrophy We must continue to grow and improve in our quality efforts".

Therefore, the department must establish its quality improvement goals and state how it plans to achieve them. An additional component of recertification involves surveys of internal and external customers that assess departmental performance.

The Benefits It Brings:

As a result of its TOM system, Allen-Bradley has been. dramatic decreases in its internal and external failure costs. For example:

Final test yield percentages for most,p d,upts are in the very high 90s. Also, many first test . , yield percentages are in the very high 90s.

One division that quadrupled its size over the past 10 years has seen an absolute reduction in warranty returns over the same period (representing over a 75 percent reduction in war-ranty returns).

steps:

Between 1982 and 1988, the company saveu in excess of 9100 million as a result of reduced, quality costs. We have a payback in excess of 13 to 1 on everything we have invested in quality improvement". Hartel says.

Allen-Bradley has experienced a dramatic increase in market share. "and we feel that a major portion of this is attributable to improved quality and reduced cost". concludes Hertel.

CASE STUDY - 3

PPQ 'S JOURNEY TO ISO 9000'

Many management accountants have heard about ISO 9000 but don't really know what it is or bow it may affect their organizations. One:fact is clear- ISO certification is becoming a, requirement for companies to remain competitive in the international markets, particularly Europe,

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At PPG Industries' Specialty Chemicals Division we Started. our journey to ISO 9000:irrioly 1991:'abd-Our goal is to be certified before the end of the year. Currently we. are preparing for the preliminary audits.

During the past year we learned that achieving ISO 9000 can be summed up in four simple ssteps.

- Document what you do
- Do what you said you will do
- Control nonconformance
- Control change

We also discovered that the costs of achieving certification are not small. A typical est - mate for auditing and registration fees alone is around $35.000. This figure does not include the enormous amount of time involved by many individuals in the organization. in addition, future costs are involved in maintaining certification.

On the positive side. the paybacK can be enormous. The resulting reduction in the price of nonconformance will often offset much of the cost.

6.4 WHAT IS ISO 9000?

PPG Industries. Inc. was established in 1883 and makes flat glass and fabricated glass products. continuous-strand fiberglass. decorative and protective coatings. and industrial and in-ternational facilities and is committed to becoming a world-class supplier in the surfactant and specialty chemicals market. Our department managers were introduced to the ISO standards during a presentation by representatives from a PPG Fiberglass plant that had just been registered to the ISO 9002 standard.

ISO 9000 is a series of five international quality standards developed by the International Organization for Standardization (ISO) in Geneva. Switzerland. The ISO 9000 standard provides some basic definitions and is a road map to using the other standards in the series.

The ISO 9001 9002. and. 9003 standards are for external quality assurance purpose for use in contractual situations. ISO 9001 ensures conformance to requirements during design and development. production. Installation. and servicing. Therefore. engineering and construction firms and manufacturing companies who design. develop. produce. install. and service their products are covered under this standard.

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The quality system requirements for ISO 9001 are listed in the following Table

Quality System Requirements

Management Responsibility	-	Inspection, Measuring, and Test Equipment
Quality System	-	Inspection and Test Status
Contract Review	-	Control of Nonconforming Product
Design Control	-	Corrective Action
Document Control Handling.	-	Storage, Packaging, and Delivery
Purchasing	-	Quality Records
Purchaser Supplied Product	-	Internal Quality Audits
Product identification and Traceability	-	Training
Process Control	-	Servicing
Inspection and Testing	-	Statistical Techniques

ISO 9002 specifies a model for quality assurance when only production and installation conformance is required. This standard is particularly relevant to process industries where specific requirements for products are stated in terms of an established design or specification. Chemicals, food, and pharmaceutical companies generally seek certification under ISO 9002.

ISO 9003 requires only conformance in final inspection and testing. This standard concerns small shops, equipment distributors that inspect and test the products they supply, or divisions. within an organization such as laboratories.

ISO 9004 contains guidance on technical, administrative, and human factors affecting the quality of products and services. This standard provides guidelines for developing and implementing a quality system.

When we began our journey we discovered that much of the chemical industry was seeking registration to the ISO 9002 requirements. Deciding on the appropriate standard for our business was not easy. Because our company is a specialty chemical manufacturer, the design and development of new products is an important feature of our business. Our general Manager believed that ISO certification would differentiate our business from our competitors(s. It would also he believed, encouraged our two manufacturing plants to work more closely with our research and development facilities.

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Getting Started:

The first major step was to create the quality preject manager position to organize and manage all activities. The co-author of this articles Joseph J Jozaitis. was named to this position. Because PPG Specialty Chemicals has been using the total quality process for several years. our second step was to assign Quality Action Teams (QATs) to each of the quality system requirements of the ISO 9001 standard listed in table 1, Twenty. teams of more than 100 employees at three different sites were Selected by the project manager These team's are cross functional. include representatives for the appropriate sites and departments, and have the necessary skills. Their purpose is to:

- Understand the requirement of its section of the standard
- Evaluate what we currently do pertaining to that section
- Recommend additions or new procedures needed to conform to the standard.
- Implement any new requirements or work with departments to implement the new methods or tasks.

Last July. team chairpersons met with their individual teams and reviewed the ISO standard and the information given to them about the project. It was very important to get each team going in the right direction. and this effort needed more attention. and education than we thought. Originally. Some teams had a clear task ahead of them. Others were confused and uncertain about how to deal with the generic language of the standard because the Same requirements can be applied equally to companies making chemicals or to companies designing computer systems and software.

Source of Information:

We decided not to use consultants to help us with the certification. Instend: we built up a network. of information sources to answer questions and keep the terms going in the right direction.-

An important resources for us the PPG Fiberglass site- because its managers have al-ready achieved certification. They have been 'helpful in areas such as calibration and laboratory testing. We have been able to apply what they have experienced to our specific situation. -

The quality projects manager is the contact person for all ISO matters. He has developed a broad base of knowledge about ISO through his attendance at training sessions on the ISO 9000 standard and quality auditing process with several site quality coordinators and the director of quality for the

PPG Specialty Chemicals group. Together they-form a network share infor-mation. on specific topics. Other groups involved include customers and ven-dors and the individuals responsible for our actual registration audit.

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Progress Is Made :

The job of the quality projects manager it to keep the terms focused on the standard. While several teams did not attack the proolem aggressively, others charged ahead but went off on a tangent and lost sight of the real issue.

Although each team has worked at a different pace. they . agree that our current quality system shares several common features. First, most of our current system is good and can be used to satisfy the ISO requirements. In those areas that are lacking, additions can be made so that all functions con-form to the standard. The teams also came to the realization that we are under documented and have a tremendous amount of procedures to write or rewrite.

Finally we identified a need for a cultural change The total quality pro-cess was changing our way of thinking about requirements and work pro-cesses. Our goal is to nurture this new culture and avoid shortcuts that may lead to non conformance. We have found that the ISO standard encourages and often insists on improvement. When any change becomes part of your process, that change must be documented and controlled.

The Quality Manual:

The team involved with quality systems is responsible for writing the quality manual. The manual states our business unit's quality policy as well as our policy and commitment to each of the 20 sections in the ISO 9001 stan-dard. The quality manual details exactly what we do in each specific are area to conform to the requirements of the standard. It also notes standard operat-ing procedures (SOP) and other documents to point the reader toward greater. detail for a given work process or function.

The manual was created from sections contributes by the teams. The quality projects manager assembled the manual with help from the quality sys-tems team. The manual also documents standard operating procedures, pro-cess instructions, specifications, laboratory test methods, and other procedural documents.

The position of the manual that covers what vie do in each specific area to conform to the ISO standard is the central document of our quaky

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system We decided to completely replace our old manuals and structure our documentation to conform to the sections in the SO 9001 standard.

Internal Quality Audits:

As the QATs were completing their tasks and the indiviuual departments began to take on the workload, the internal quality audit function acted as the driver to bring the tasks to a close. The internal quality audit teams are responsible for highlighting areas of nonconformance within each department.

The internal quality audits of nonconformance to simulate the audits we will be receiving from the ISO registration body. These audits will be run by people familiar with our system. We believe that if we can pass our own internal quality audits we should not encounter problems with an external audit.

Our first system-wide audit was conducted in December 1991. It was called a "survey" and was used to help departments identify what they needed to do to be in compliance with the standard. We created a work list to help each department decide which standard Operating procedure needed formalization This audit was a huge success and got all departments moving in the right direction.

The second system-wide quality audit began in April 1992 and as of this writing is still in progress. For this audit we are concentrating on compliance with the quality manual, on the existence of all documentation required by the quality manual, and on a detailed check of records to see if we do what our procedures say we should do.

6.5 QUALITY FOR PROFIT:

There is a great deal of profit to be made by quality improvements in products and ser-vices, business processes and people. Internal analysis at IBM, for example, put the cost of non-conformance or failure to meet quality standards in its products and services at a minimum 11 percent of revenue or $5.6 billion in 1986. (They suggested that companies of similar size had comparable cost). To this figure can be added the costs of having poor business processes Launched in May 1985, IBM's 'Quality Focus on the Business Process. was targeted to save a conservative $2 billion, worldwide. in improving process alone. The two estimates taken together, understated as they are, represented $7.6 billion worth of potential savings.

Saving on the cost of people is still another potential area for adding to the profit margins. Labor turnover in the UK restaurant industry runs at about

60 percent each year In one company alone - a division of one of the largest UK restaurant companies - the labor turnover for hourly paid staff was 295 percent per annum. The amount of money spent in recruiting software engineers in high-tech companies runs into hundreds of thousands of pounds. The scope for saving here is stagbering. The conclusion that quality improvement in products and services, business processes and people is profitable is inescapable. 'Expressed in business terms, quality - or the lack of it - is the single greatest factor in achieving market success for any company', said Peter W. Moir, a former Senior Writers Editor, Advertising and Publications, IBM, 'and must therefore be a matter of prime importance for executive management'.

In the last decade most major companies have launched full-scale quality programmers few of them are the following:

Leadership Through Quality (Xerox);

Quality the ICL Way (ICL);

Quality Service Programme (NatWest);

Total Quality Culture (Texas Instruments):

Total Quality Excellence (Ford):

Quality Focus on the Business Process(I BM):

Quality Enhancement Strategy(National Semiconductors)

In these companies and the thousands of others; additional profit is achieved through qual-ity improvement. Rather than rely exclusively on the route of increasing sales to gain profit, which of course increases operating costs, quality improvement becomes a short cut to improved profits. The actual quality improvement also increases sales by generating customer demand which has its own momentum in the market.

RIGHT FIRST TIME:

At the heart of TOM is the conviction that it is possible to achieve defect-free work most of the time. This assertion is phrased in various ways as right first time, working smarter or zero defects. The ideals to strive for ice skating supremacy in the international competitions that made them world champions. The row of 5.9016 point scores from the judges became the norm for the two dazzling ice skaters. One may not always achieve the target, but the 'mind set' to strive for perfect work is important. It's better [in this sense], to aim at perfection and miss than it is to aim at imperfection and hit it', said Thomas J. Watson, the founder of IBM.

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The right first time or zero defect is the result of an emphasis on prevention. and the diligent use of measurement, process controls and the data-driven elimination of waste and error. It serves as a goal for continuous improvement. Prevention is the aim of ail quality assurance. Through planned and systematic action such as documentation of work processes, or cost of quality audits, quality assurance prevents quality problems..

Quality management is all about prevention. As Philip B.Crosby said the purpose of it [quality management] is to set up a system and a management discipline mat prevents defects from happening in the company's performance cycle. To accomplish this you have to act now on situations which may cause problems some time from now Act now for reward later_.

The idea of prevention is a difficult one to find practical support for Yet it is pivotal to a TOM programmer. Why should anyone spend time sorting out complicated quality problems when they could have been prevented in the first place? Yet while most people subscribe to the desirability of prevention, it remains for mot illusionary, impractical or simply unattainable, That to err is human becomes or zero defects are simply performance standards that fly in the face of conventional work practices that seem to have an anticipation of failure built into them.

Check your Progress

5. What are the series of ISO 9000 certifications?

For many managers and employees. then. the TOM preoccupation with prevention in-volves a 360 degree shift from their normal attitude to work performance. It means breaking from the dual standard that they often set up - one standard for their own personal lives where they expect quality service and good products up to standard and one for their work life where they expect safety nets to catch mistakes and put right shoddy work.

6.6 ACCEPTABLE QUALITY LEVELS:

Out of the dual performance standard arises a willingness to put up with acceptable qual- poc ity levels (AQLs) at work. The concept is best illustrated by a real case. An IBM firm in Windsor, fori Ontario, ordered a shipment of components from a Japanese firm. specifying the AQL as three ac defective components for every 10,000 parts. In a covering letter from the Japanese supplier to the On i IBM firm (which was reprinted in the Toronto Sun) that accompanied the order the Japanese corn- qua pany explained how difficult it was to produce the defectives parts and said 'We Japanese have hard time understanding North American business practices. But the 3 defective parts per 10.000 have been included and are wrapped separately. Hope this pleases'.

men Acceptable quality levels which have arisen in industry since the end of thE Second World OW! War offer a diametrically opposed mind-set to total quality. Instead of getting it right first time, focused on zero defects. the company encourages defects by setting AQLs. In reality as quality improves, defects are reduced and costs decline. If one sets an acceptable quality level of 99 percent the result are; at least 200,000 wrong drug prescriptions each year; more than 30,000 newborn babies accidentally dropped by doctors/ nurses each year: unsafe drinking water almost four days each year: no electricity. water, heat for about 15 minutes each day; no telephone service or television transformation for nearly 15 min-utes each day; at least one misspelled word on every page of a book. The US government spent approximately $785 billion on goods and services in 1984. A 99 percent AQL would have meant that 1 percent of those goods and services were waste or scrap-a staggering $7.8 billion worth.

Edward J. Kane, director of quality for IBM. gave an example of a quality focus on the business process:

The billing process consists of 14 major cross functional activities which tare logically related but physically dispersed among 255 marketing branches and 25 regional officer's. a similar number of field service .locations and' Severral headquarters operation and Manufacturing sites. . The work IS dross functional and non-sequential within any function. It is tied together by a complex information System: 'Overall. 96 % of the invoices are accurate. but because of the high cost of adjusting those that are incorrect. 54% of the total resource was developed to cost of quality Some of that cost for prevention and appraisal (98.5% of the invoices delivered to the customer are correct). but most of all the errors can be attributed to failure of some kind This is testimony to the need to prevent errors rather than to fix them after the fact.

COST OF QUALITY:

The cost of quality is a shorthand formula for all the business costs incurred in achieving a quality product or service. These include prevention costs. appraisal costs. internal failure costs. external failure costs. the cost of exceeding customer requirements and finally the cost of lost Opportunities. Taken together these costs can drain a company of 20-30 percent of its revenue or turnover (see Figure 2.6). Key areas of waste in a company include material: capital and time. of which time is perhaps the biggest cost. Cutting the cost of quality is so central a concept to TOM that Chapter 3 deals with it exclusively.

The question her arises about terminology. Should these costs not be called the 'cost of poor quality', or the cost of nonconformance. Although, on the face of it, there is a valid argument for referring to the cost of poor quality', there are stronger arguments for using 'cost of quality as a catch-all category. Logically quality costs include 'prevention' which is not a cost of poor quality., On the contrary prevention costs are incurred in getting it right first time and in setting up a total "quality programme. Most importantly, in much of the quality literature of the last 45 years, the category cost of quality is referred to in the specific meaning given here - as the total cost in achieving quality, including prevention, appraisal, internal and external failure, exceeding require-ments and lost opportunity.

6.7 OWNERSHIP AND ELEMENTS OF SELF- MANAGEMENT:

It is rare for a person to do home improvements or repairs on a house they are just renting. The DIY business would vanish oVernight if home ownership disappeared. One of the causes of othe sudden collapse of communism in parts of Eastern Europe had to do with ownership. Few people felt they owned anything in the old system Parallels in industry are obvious - people care mostly and almost exclusively about things they own. For example, the purpose of the John Lewis Partnership as cited by Spedan Lewis, the founder is all about ownership. He said The Partnership's supreme purpose is to secure the fairest possible sharing by all its power, that is to say, their happiness in the broadest sense of that word so far as happiness depends on gainful occupation.

It may not be possible for most peopie to have commercial ownership of the firm they work in but they can at least enjoy- psychological ownership at work. -Total quality programmes areo founded on the principle that people want to own the problems, the data-driven investigations, the processes, the solutions, the recognition and ultimately the success associated with quality improvement

By advocating psychological ownership TQM ties in with developments in organizational design away from traditional models of imposing management control over employees' beheviour. Professor Richard E. Walton, at Harvard University, argues fora change'

Today, in response to massive evidence that control-oriented management models can Produce outcomes that subvert the interest of both organiza-

tion and the people who work for ithem. A new workforce management model is appearing. The premise of the emerging model is that organizations must elicit the commitment of their employees if they are to achieve a sustain-able competitive advantage in contemporary markets.

The change from a control tc a commitment organizational model, Walton argued, an- is b flounces a radial change in how organizations are designed and governed. Instead of depending the on management controls to produce employee cooperation and Compliance, companies in the eve future wi', rely mostly on member self-management to achieve common goals. Total quality management is being used as the vehicle for eliciting greater employee commitment through shared decision making in problem-solving quality-improvement teams. Some companies take it further pers and use the employee involvement aspects of total quality management strategically to introduce lead forms of self-management.

J. Richard Hackman. a Harvard professor. establishes four separate functions for work to be carried out in a company in terms of the allocation of organizational authority. First. people ard-execute the work. Whether it is physical or mental work people expend energy to do the tasks., and I Second. a Person must monitor and manage the work process This person or group - gathers. data of about the progress of the work and interprets the data. taking 'corrective action wherever it is required. Third, a person mutt design the performing unit.. necessary resources for for rthe work, structuring tasks and assigning personnel to them and establishing norms for the work groups. Fourth. a person must be set direction for the Organizational unit and determine the collec-histor tive goals and mission of the organization. Hackman then identifies four types of performing units deep based on the separate functions. spate The continuum runs from a management-led unit (the traditional form in the United King- Amen dam) to a self managing unit (the unit most suited to TOM programmes) to a self-designing unit public (as in top management task forces) to a self-governing unit (as in a corporate board of directors). enwall ra Total quality management programmes encourage work groups to take on the functions of a a self-managing unit. Members of work groups are asked to take greater personal responsibility i Although for their outputs in terms of meeting internal and external customer requirements. The emphasis gone at is on personal accountability for the quality of the work they do. They are also taught to measure the quality of their outputs against standards like zero defects continually monitoring their own What performance. collecting data.

using competitive benchmarking. actively seeking feedback on how leaden well they are take their own corrective action on improve their performance. If they do not have the players help or resources needed to do jobs well they are prompted constructively to demand what rise. they need. All this is done with a chain of quality in mind so that people are aware Of the linkages s between their performance and of their co-workers a helping culture is developed While the emphasis is on getting one !s own house in order first. the responsibility is fostered for reaching out - . . of help other workgroups with interface problems. Dialogue .around agreed internal customer requirements serve this helping function. MANAI

MANAGERS AS ROLE MODELS:

The almost religious fervor of .Philip B. Crosby's exhortation and his zero defect pledge is indication part of his style. But it is not exclusively his Most TQM experts get evangelical about their mes-sage. The parallels between the wrenching of oneself away from one way of behavior and (applying oneself to another quite different from of behavior in the pursuit of goals of perfection in r total quality has a monkish ring to it. The motional or conversion to total quality and zero defects member 1 is both personnel and public as it is supported by the band of brothers (and sisters) at all levels in the company. There is also an element of personal witness and leading by good example: 'I learned even though I had been preaching this for years. that when it comes to quality. the witness of management is more important than anything else'. Crosby said.

The parallel with what is expected of total quality managers in terms of behavior that they personally live - out. the messages they proclaim. and what people expect of religious and political leaders draws itself. A few years ago Americans were astonished to see some of their most celebrated television evangelists involved in major moral scandals (born again in the hotel religious as Mr and Mrs Smith). One such preacher is now serving a-45 year prison sentence for fraud le and tax evasion. Another admitted to wrong doing with a prostitute to a global television audience s. and lost two - thirds of his vast television congregation over it he is now embroiled in a defamation ta . of character law suit against him over his claims of serious misconduct against a third television is preacher. whose initial accusations led to his own downfall. It is a sorry sight for followers looking or for religious role models. irk

Revelations about the hypoc sy of President John F. Kennedy have recently been given historical status with the publication of an academic study of

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the life of Kennedy, The realities are o deeply disturbing to his countrymen and admires around the world, for the book Substantiates the spate of wild articles in the popular press about the president's immorality over the years. The American president is supposed to combine the role of king and prime minister, and therefore the init public rightly expects the president to set a moral example and to support 'traditional values', as well as to keep out of danger of blackmail. Kennedy failed on all counts, despite his ability to en-thrall his listeners with his eloquence and to project an image as a stylish, caring, family man. ; of Although total quality cannot be 'achieved by exhortation by senior managers, like organized religion and politics, it needs to be led from the top by genuine role models

At all levels managers need to be conscious that they are role models for total quality own What they say about total quality is important. What they do is absolutely critical. 'Teaching people, low leading people, showing people, providing tools - everything loses meaning'. Crosby says, 'if em-the Ployers, customers and suppliers feel that management is not walking like they talk'. A BBC se-,hat ries, written and presented by Charles Handy, was called Walk the Talk and included a TQM case ges study, 'B. Elliott Expects', which focused on two companies, Il/ITE and Russell Castings.

The very best TQfyl programmed accordingly builds in a system of management feedback out so that managers get some idea. on how they are doing as role models for quality

MANAGEMENT ROLE FEEDBACK:

Performance feedback is vital to enable managers at all levels to improve their contribution to the business. Feedback provides information's on where a managers is today and gives an indication of the level of improvement compared with previous feedback.

There are two types of feedback that are relevant here. The first is the traditional performance review. The work group managers should have a formal discussion with each work group member individually at least once a year. The review should cover the following items.

* Individual performance against key business objectives
* Personal strength and areas for improvement.
* Training needs over the next twelve months.
* Future career aspirations

* Individual's and manager's comments on the performance review.

The second is managerial style feedback. Before managers change the, way they man-age. they should know that improvements are needed in their current management style. They should also know what aspects of their style should not be changed. The starting point for improv-ing management style, therefore, is an honest assessment of managers current behavior by people who are familiar with it There are three directions of feedback (see Figure 2,11) as follows:

* Work group manager to work group member (superior feedback)
* Work group member to work group manager (subordinate feedback).
* Work group member to work group member (peer feedback).

There are six general management areas where feedback is important in the total quality process as follows

1 Leadership (directive/supportive): task management: delegation: de-cision making

2. Team work: interactive behaviours; participation.

3 Communications: active listening: two-way information sharing: per-sonal rapport

4. Motivating: presence (visibility / accessibility / encouragement! in-terest) recognition: reward.

5. People development: personal performance reviews: career develop-ment: suc-cession planning.

6. Commitment to the total quality process; use of a quality delivery process,

TOM system: quality improvement projects! application of the problem-solving process. o An appropriate feedback questionnaire should be designed to be completed by one's man-ager. his or her peers and his or her own work group members at least once a year so that the manger can analyse and mea-sure progress and understand perceived strengths and weakness.

RECOGNITION AND REWARDS:

An appropriate system of .recognition and reward is critical to any company's TOM programme. particularly as the quality improvement process offers greater involvement to ordinary working people. Positive reinforcement through recognition and reward is essential to maintain achievement and con-tinuous improvement through participate problem-solving projects.. People' work

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for many reasons - for achievement. advancement. increased responsibility. recognition,. job interest as well as money:

Although the words are often used together. recognition and reward: are quite distinct con-cepts. Recognition from its Latin root cognoscere means 'to know again': It is a means of encouraging individuals and groups by acknowledging their achievements. It also serves as a further efforts through appreciating contributions already made. There are both formal are presentation of their accomplishments at management reviews. publication of achieve-in company media, a letter of thanks and commendation. lunches or dinners. award certificates plaques and other tokens. Informal recognition includes words of thanks, gestures of appreciate! :- and favorable comments made to others about the individual or group.

Reward is the giving of financial benefits linked to performance, further reinforcing the day-to-day recognition processes. Two examples are merit-based increase in earnings resulting from performance apprais21 and the promotion of an individual who contributes in a major way to quality improvement.

Both recognition and rewards have a powerful motivating effect on people at work-They enhance a person's awareness of self-worth and self-esteem. The giving of recognition and re-wards are gestures that recognition a person's uniqueness and human dignity. They also have a social value since they are often given in the presence of colleagues.- The way recognition and .. rewards are perceived, ,administered and received are an important part of the change process stimulated through quality management. Managers have a key role in this process.

The following are recognition and rewards guidelines for managers:

1. Managers should look for positive behavior to recognize and reward. rather than for negative conduct to criticize. It is 3 question of emphasis - applauding success rather than always berating failure.

2. Managers should give recognition and rewards in a public way to maximize their impact and effectiveness.

3. Managers should strive to be open and genuine in the process of recognition and reward-giving. A single word of sarcasm or cynicism can ruin a recognition programme. so can being 'over-the-top' or too slick about it.

4. Managers should have a wide range of recognition and reward options to allow them to match the recognition or reward to the individual or special group involved.

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5. Managers need to develop a sense of timing about recognition and rewards. Recognition should be continual and rewards should follow hard on the heels of achievement.

6. Managers must remain impartial and even-handed in out recognition and rewards. They should also be able to commu nicate exactly why individuals and groups are receiving awards Ambiguities in this area create hard feelings and can be destructive of the very participative process they are intending to foster.

6.8 THE QUALITY DELIVERY PROCESS:

Total quality management is not just about awareness of quality. TQM demands the imple-mentation of new systems: 'the quality delivery process is a generic name for such a system.

The purpose of the quality delivery process are to:

1 Ensure that everyone works on those activities which are most important for the success of the business by fulfilling work group missions.

2. Improve the quality of work delivered (outputs) to the customers - internal custom-ers. the next person down-the-line. who receives the work.

3: Eliminate work that is wasted because people do not do it right the first time.

4. Harness the combined skills. ideas and experience of the work group members to improve the business continuously through team work Satisfy the external customers.

A work group companies a manager in the company andall the staff who directly report to him or her These are the people who can significantly affect the quality of the work they do each day. The work group manager leads the team. The work group produces outputs which are delivered to either external or internal customers. Usually. there are only a few (five to ten) outputs that really matter and these must be identified and measured for quality

Quality improvement is achieved through projects which are 'owned' by the work group. The project team comprises two to ten people who can best contribute to the solving of business problems resulting in the improvement of outputs. A project team will continue to work on the problem(s) until the customer is satisfied with the output. To satisfy customer, work groups must determine customer requirements.. This will involve members of the work group in discussions with customers. or a sample of then if there are many for the

same output, to be sure the work is designed in such a way that they will be capable of delivering the quality required by the customers, Customer satisfaction should be measured by interview / questionnaire (direct-means) or by counting analyzing the number of complains and returns received (indirect means)... The target is for every group in the company to work on at least one improvement project at any one time There will always be room for further improvement..

There are ten steps in the quality delivery process, as follows:

1. Create mission Statement - a mission statement is .a sentence the defines the work group's activities. It is focused on the end objective rather than the means of achieving it
2. Determine the outputs of the work group and check that they fulfil the mission.
3. Identify the customer(s), both internal and external. who receive the outputs.
4. For each output, define agreed customer requirements which must be met in order to achieve customer satisfaction..
5. Develop the work group's output specification for each output.
6. Determine the group's work processes. including the identification of inputs. will deliver the outputs to the customer(s) at the lowest internal cost.
7. Identify the measurements of each output which will compare the 'actual' quaky level delivered with the output specification.
8. Identify any problem caused by a measured `shortfall' to target (or identify an -op-opportunity to exceed target at. no additional cost; or an 'opportunity' to meet customer requirements at a lower internal cost)
9. Establish a project team to solve the identified problem which will improve Wel quality level delivered to the customer (or capture the `opportunity in step' 7)..
10. Measure-customer Satisfaction against the agreed customer requirements.

Review of quality delivery process;

The following checklist can be used to to Vie.Whether each.of the ten. steps has been fully covered. A little time spent at this stage will avoid having to repeat some of the steps in the process.

STEP A: CREATE,MESSION STATEMENT

- o Does the mission statement define the Main purpose for which the work group exists?
- o Is it focused on the end objective rather than the means of achieving it?

  (it should not contain lengthy statements on the 'why' and 'how' of achieving the mission.)
- o Has it been agreed with the next higher manager?

STEP 2: DETERMINE THE OUTPUTS

- o Is the output -described clearly, so that there is no doubt about what is being produced?
- o Is the output tangible - something that can be touched, seen brimeasured?
- o Will the internal customer for the output find the description acceptable?
- o Is the work group really the supplier for this output?

STEP 3; IDENTIFY THE CUSTOMERS:

- o Is there agreement about the identification of the customer fOr this output?
- o If multiple customers have been identified for this output. have they ... that they are all customers?

  Does the customer feel that the work group is the appropriate suppliers? o Has the work group confirmed its. role with the customer?
- o Has the end user been identified where the 'output' is incorporated by other work 1 groups for another customer down the line?

Have the customers been named - specific individuals who can explicitly identify requirements? i '

STEP 4: DEFINE CUSTOMER REQUIREMENTS o -

Did the Customers themselves define these requirements?

- * I Are the requirements. as now stated; clear enough to be translated into output . specifications?
- * At this point, tan the customer requirements be met?
- * Was discussion with the customer successful in agreeing customer requirements?

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STEP 5: DEVELOP THE OUTPUT SPECIFICATION o

* Is there a clear relationship between customer requirements and output specifications"?
* Are the specifications Measurable? If not, can they be made measurable?

STEP 6: DEFINE GROUP'S WORK PROCESS:

If this is a new output; has a work process to produce it been -identified?

o Will the steps in th work process deliver the output to the customer at the agreed quality level? - o Have work group responsibilities been identified for each step to ensure the pro. cess is tarried out satisfactorily?

o Has the in- process :measurement been identified that will be used to ensure the work process is 'in contra" (i.e. capable of producing outputs at the right quality consistently)?

Is the work. process adding value at the lowest internal Cost?

o Are there any unnecessary or rework / correction activities in the work process? Is anyone checking / inspecting the work produced and how can this be eliminated?

STEP 7. IDENTIFY MEASUREMENTS OF OUTPUT

o Have measurements to determine th.e delivered quality level been selected? . .

o In general, Will the selected measurements provide early indicationsi of any pos7 oible Problems or errors?

o Will the measurements indicate whether the output conforms to the Output specification? If you were the customer, would you be satisfied that these measurements ensure the quality of the output'?

STEP 8: DEFINE THE PROBLEM

Is there an opportunity, to achieve better than target at no additional cost?

Does the target level reflect competitive best pracuces? Has the problem statement been written down?.

* Is there a shortfall betweeu actuar and 'target' (output specification) quality levels when measuring the output?

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* Is there an opportunity to achieve better than target at no additiona cost?
* Does the target level reflect competitive best practices?
* Has the problem statement been written down?

STEP 9: ESTABLISH A PROJECT TEAM:

* Who is going to lead the project team?
* Have the team members been identified?
* Can everyone on \the team positively contribute to the solving of the problem? (No room for passengers or cynics!)
* When will the first project them meeting be held"?

STEP 10: MEASURE CUSTOMER SATISFACTION

* Have the key measures of customer satisfaction (or dissatisfaction) been identified"?
* Have customers (or a sample of them if the-re are many custoMers receiving the same output) been asked whether they are satisfied with the output(s)"?
* Have the customer's requirements changed (reflecting aneed..to change the out-put specification)"?
* How frequently has the work group planned to measure customer satisfaction"?

6.9 QUALITY MEASUREMENTS

There are seven generic ways (in addition to the cost of quality) in which the quality of 'outputs can be measured:

1. Defects -(work not to specification).
2. Rework (work requiring correction).
3. Scarp (work thrown away).
4. Lost items (work done again).
5 Backlogs (work behind schedule).
6. Late deliveries (work after agreed time).
7. Surplus items (work not required). The above measurements apply to office 'outputs' (such as paper. electronic data. tele-phone calls. etc.) as Well as-to the outputs of production! laboratories / ware-house (such as parts. tools. finished products. etc.).

There are five key measurements for each 'output'.:

1. Target: the budget or target level of performance to be achieved.
2. Forecast: the forecast level of performance which may be better or worse than the target depending on current business situation. The forecast also shows when the target will be reached
3. Actual: the actual level of performance achieved to date.
4. Problem: the difference between the actual and target level of performance where 'actual is worse than 'target'.
5. Opportunity: the opportunity for improving quality better than target at no extra cost.

TOM IN A SERVICE ORGANIZATION:

Macdonald, Levine, Jenkins & Company is a 20-person CPA firm located in Boston. For years, the firm offered the traditional CPA accounting services but differentiated these services but differentiated these services by maintained an early leadership in the computer in its market segment..

Following the widespread availability and use of computers, the directors came to realize that the differentiation of computer expertise had been diminished and the firm was becoming indistinguishable from other CPA firms, effectively reducing the company's services to commodity status. A commodity has but one differentiation: price! What had happened was tho.t the firm had essentially lost its distinguishing differentiation and was concentrating on services as it defined them, not the way the customer defined them.

o After the managing director had attended a TQM seminar, the firm's management decided to put more emphasis on continuous conformance to customer expectations and needs Prior to this .TQM "awakening," performance was measured by using the Classical .benchmarks such as number of new clients, total billings, etc. These measures, of course, are of little or no significance. to the client. When submitting a sales proposal to a client, it had been customary to set high goals that promised, service delivery without regard to the prospective client's desired level of service or what constituted satisfaction' in the mind of the client. In other words, in order to increase the Chances of obtaining a prospective client's business, the firm promised performance levels that.' were rarely kept in reality. The firm was in a double bind On the one hand, the sales proposal Was based on measures that the firm, not the customer, thought were appropriate, and the firm was setting itself up for failure by not delivering as promised. For example, one proposal offered to perform

analytical reviews based on the client's internally generated financial information, but the product frequently was delivered late due to the difficulty of obtaining client information. The company was faced with the paradox of disappointing a client who never would have asked for the service if the CPA firm had not offered it in the first place. Following the company's conversion to TOM awareness, it was found that asking clients what they really wanted revealed that their needs -; were really very simple and unlike some of the performance measures or services that had been proposed.

GETTING STARTED WITH TQM

Training was the initial an.d major step in implementing the TQM process. Everyone in the firm participated, including both owners and clerical staff. Each was asked to identify problems and possible solutions to. selected topics such as communications. Brainstorming during group . training sessions identified 52 possible. quality improvement projects. It was decides to initially tackle the top five

1. Network office computers
2. Develop a strategic account process for managing client relationships
3 improve the billing time and process here
4 improve the image of the firm
5. manage the overall TQM process.

Clients Satisfaction

(1) Bills paid on time

(2) Score 93% on satisfaction survey cided

(3) Reduce billing. adjustments. by 50% lor to

(4) 1mprove accounts receivable days ch as outstanding by 30% :CHance goals

(5) Increase referrals by 200% ice oı

(6) increase client retention-rate by 50%'s 'that ii was - I was

Employees Satisfaction

(1) Decrease turnover rate -ed to

(2) Lower absenteeism ut the corn-

(3) Satisfaction survey or the ion to leads

Owners Growth (1) Increase number of clients and revenue been per client by 200% within 5 days.

Profit (2) Increase per-shareholder profits by 200%.

Recognition (3) Win Malcolm Baldrige Award

Annual planning includes both a quality as well as business plan in which the'"eyiden.ce of success" serve as a game plan for the entire firm. Each year, the plan's reviewed by the. quality steering committee and changed as appropriate.

Client Input

The TOM needs of clients are determined through TOM awareness surveys. Questions are asked concerning activity-based costing, cost of quality, problem solving, product cost and / or process management, process costs, and product / service costs. From this client input, the firm 'here 4 improve the image of the firm

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The critical factors were developed by the teams with guidance from the coordinators. addition to the critical factors there are 35 area measures that track such things as computer down-time, nonscheduled maintenance,, or inventory accuracy. Because the Baldriae Award cri-teria placed so much emphasis on data gathering, it was desirable to get every plant employee (called associates) involved in the job of gathering data. Periodically the need and value of the different measures were reviewed and some were dropped. For example. it was decided that the tracking of inventory items in the proper location and lost-time accidents was a poor idea because there were so few transactions that were meaningful. Other measures were added as time progressed, such as the number of customers below a certain percentage of gross profit, so that these could be used as a target for improvement. Delivery performance of all accounts, not just' the top five, was added for tracking.

Each customer special order is defined in terms of customer specifications and the pro, cess defined and tracked. Processes could be outside of manufacturing For example, if the speci-fication is one-time delivery, then pulling the item from inventory and transportation is part Of the process : Continuous monitoring and study of a procesSredtkedlailures, rejects, or network. - Employees were extensively trained in problem solving, SPC and topics related to TOM. .On-the-job training (OJT) teams were organized to study a process within their work area, define the mission of the process, and produce an "Ideal Process Flow" that forms the basis for a standard operating procedure (SOP) and a specific job work instruction for each step in the process. The company's computer system is the load-bearing structure of the entire system: All plants have computers hooked into the mainframe at headquarters where SPC measurements are tracked. Most of the company's orders come in via an Electronic Data Interchange (EDI) system. The EDI system allows the company to build relationships with customers as well as suppliers. It also reduces errors, improves cycle time, and allows just-in-time principles to work.

Questions for Discussion

1. What additional information systems, other than the ones mentioned,

would you recommended for this company?

2. Can SPC be used in processes outside of manufacturing? For example, order processing, accounting, billing?
3. Is it a good idea to "track" performance of plants at headquarters?
4. Choose two or three measures that you think would be desirable and describe

   (1) objective (2) information needs (3) information sources.

Company #2 - Wallace Co.. Inc. :

The company is an industrial distributor of pipe. valves, fittings, and specialty products serving the refining, chemical. and petrochemical industries. Corporate officers are in Houston. Texas with nine branch officers in three states. Employees number 280 and sales were approximately $90 Million in 1990. The company has long-term "partnering" relationships with such firms as Union Carbide, Monsanto, Hoechst Celanese. Dow Chemical, Bechtel, and Brown & Root Braun.

The following is quoted from the condensed version of the Baldrige Award application. Information and Analysis

The Information and Analysis category examines the scope, validity, use, and management system. Also examined is the adequacy of the data and information to support a responsive prevention approach to Quality based upon "management by fact." - .

We used the following criteria to determine the types of Quality-related data to be maintained in our information base:

- First, the data meet internal customers' needs (e.g., sales reports, branch financial statements and inventory records).
- Third, the data help improve the company's Quality leadership practices (e.g., turn-over, training, promotion data).

  We maintain data in the following categories:

- Customer
- Competitive
- Internal Operations & Processes
- Benchmark data
- Associate
- Quality Results

Safety Vendor Quality Health.8. Other Regulatory

NOTES

We have had a company-wide computerized information system since 1964. It has been consistently upgraded, most recently in 1988 and 1989. The system provides on-line data to all associates so that, for example, an inside sales person in Texas City can check the inventory available at any other district office. Validity of data within the system is audited by reviewing performance data with customers, by a perpetual inventory management system, and through an annual financial audit.

A recent innovation of the Wallace computer system also set a new standard for the fstri-bution industry. Material Test Reports (MTRs) can now be scanned into our computer syste,- for immediate customer access. For example, if a customer wants an MTR on carbon steel pipe said six months ago, we can access the data, print a hard copy, and fax this hard copy to the customer_ We use our data base for SPC charting and analysis. Service performance trends, includ-ing on-time deliveries and invoicing errors, are monitored on control charts maintained by SPC Coordinators in each district offiCe. These trends are used to project percentage improvements. Some processes where Quality data have been Used for improving include

* On-.the-job Training Teams
* Customer Base o Sales Performance
* Inventory Trends
* Electronic Data Interchange(EDI)
* Accounts Receivable

The QMSC reviews. and 'analyzes all Quality data monthly to plan short., and long-range: Quality Activities and to target specific process for improvement:

Questions - for Discussion:

1. Wallace is a distributor, not a manufacturer. How would information needs for a distributor differ from those of a manufacturer?
2. What is the meaning of the Statement "support a responsive prevention approach to Quality based upon 'Management by Fact?'"
3. The company maintains information systems for the purpose of meeting customers' needs. How are these needs determined for external customers? For internal customers?
4. Name two or three types of benchmark data that a distributor might collect.

5. Choose two of the processes mentioned (e.g., sales performance, customer base) and show how Quality data can be used for improvement. 'Company #1.,-Bartlet.t..MaOine: Tool Company It Was June 30, 1992 and the end of the Company year Results had deteriorated to the point where dividends had to be fornicated and 25 Percent of the work force let go. Reductions I were made on an across-the-board basis rather than selectively .because it could not be deter-mined which jobs and activities were productive or non-productive. Bartlett Machine Tool Company was an old line firm that had been well known in the Indus-! try for over 50 years Manufacture of cutting tools such as drills,: earners, chucks, cutters and gauges, the company's products were highly regarded for quality and durability as well as after-! sale service. This reputation for quality and service had. been achieved at a high cost. It was a matter of pride that no defective product left the plant and a policy of 100 percent final inspection . . insured that specifications were met. Frequent line stoppage and set up were necessary to meet the special orders that customers required. Rejects and rework amounted to approximately 5 percent of production. A service force of 65 highly skilled field technicians and engineers maintainted contact with major customers. These individuals frequently doubled as salespersons.

Dave Hobver, President, blamed the poor financial results on the "double whammy" of the recession combined with increasing :foreign competition whose wage rates. were 'Substantially bellow the rates at Bartlett. Privately, Hoover admitted that he really didn't know. why the company. sales were declining while costs were rising. The management information system (MIS) did not provide adequate information to track results against plan..

Few problem causes could be identified or decisions made with the information available. The existing MIS was little more than a monthly report of actual costs compared to budgeted cost. Sales and cost data were aggregated and could not be broken down by customer,- cost or process center, or major overhead category.

The situation regarding information systems had continued throughout 1991 and into 1992 despite the hiring of an MIS expert and a staff of four. The effort of this group had been spent on the conversion of a conventional accounting system to what the group hoped would be a financial planning system. This latter system was perceived as representing the business plan as well as the strategic plan although it was little more than .a generalized projection of sales and expenses:-

Dave Hoover knew that a more sophisticated approach to information was necessary in support of a strategic plan that was yet to be devised The need for such a plan of action was reflected in the changing environment of the industry. Commodity products. of the type manufactured by Bartlett were being replaced by laser cutting, bonding, and other more advanced technology. Hoover felt the need to keep abreast of these changes as well as customer needs. He was also concerned that personnel in design engineering and sales would become outdated if environ-mental trends continued.

Company headquarters were located on the fifth floor of the main manufacturing plant Manufacturing was conducted in the main plant and three smaller buildings located nearby. Differ-ent processes were done in different areas; grinding in one, testing in another, milling in another, and finishing in the main plant Some processes were not in the same building and goods had to be moved from one area to another for the next step in the manufacturing process area to another o resulted in an overhead rate that was much higher than the industry average. This system also required an Unusual inventory of Work-in-process and caused other delays end -bottlenecks. For example, Cycle time for a standard commodity drill was six months whereas other Manufactures could do it in less than an hour. "Firefighting!' was common as the system had to adapt to production. needs and customer demands.

The company had recently organized around three strategic business units (SBUs), eaCh headed by a product manager who had bottom line responsibility for his product group. The reorganization had caused numerous problems. First, there was the matter of the product managers'

profit and loss statements (P&L). Because existing information systems could not generate data by product line, each product manager was at a loss to determine which of his stock keecr7c units (SKUs) and other information for adequate planning and control was not available. There were frequent disagreements between the product manager, sales, manufacturing. and design. Besides the need to establish profitability figures, the product managers began to fall behind as their time was spent in negotiating production targets and pricing with other departments and responding to customer demands. An additional problems was the excess inventory that had been built up over time. Production targets had been set by sales forecasts made up field representatives but frequently these forecasts failed to materialize. Dave Hoover felt that up to 25 percent of inventory was obsolete or unsolvable. He also felt that 80 percent of his sales were coming from about 20 percent of the items but he had no way to go about rationalizing inventory or production

NOTES

Questions for Discussion

Compare the quality information systems at Anderson Technology and Wallace .Company. with the needs at Bartlett Machine Tool Company. For Bartlett:

1. Identify the critical factors related to the manufacturing. processes at Bartlett (see Anderson Technology).
2. Name five additional measures that should be tracked.
3. Would you organize one or more cross-functional teams? If so, what activities would be represented'
4. What are the top three priorities for internal customers' needs (e.g., sales reports, production schedule, etc.)?
5. In preparation for design of a management information system, name three cat-egories of information that would be apprbnriate for be-ginning the design process (e.g., vendor, benchmarking, etc.).
6. Name three processes that lend themselves to improvement by the use of statisti-cal process control (SPC). 7. How would you go about reducing the cycle time of a product from design to ship-ment? 8. What subsystems would you include if you were asked to devise an MIS master

Peter-Drucker is perhaps the most highly regarded management philoso-pher in the West-ern world. In the following article he describe how Japan is restructuring around "brain power" rather than "manufacturing power," This means moving from total quality management toward " zero defects manage-ment. This dual movement means increased emphasis on cycle time in bringing products to market, along with implementing organizational devices such as cross-f unc-tional teams and empowerment.

ANSWERS TO CHECK YOUR PROGRESS

1. ISO 9000 is a guide that clearly specifies the characteristic of a quality system and thus provides a sense of security to the users
2. The typical company operates with a vertical, functional organiza-tional structure based reporting relationships, budgeting procedures, and Specific and detailed job, classifications., which adopts a total quality management concept.

3) Team Membership and Motivation , Motivating factors Team Mem-bership Job development (the work),,Vertical loading Provides re-

NOTES

sponsibility Job closure Team members

4) Management Responsibility. Quality System . Contract Review Design Control Document Control Handling. Inspection etc..

5). ISO 9001. 9002. 9003 and 9004.

REVIEW QUESTIONS

1. What is internal Quality?
2. Explain the importance of Quality assurance in organization
3. How do you implement Quality management initative?
4. Explain the Quality delivery process.
5. TQM is needed for service organizatio. Why?

NOTES

MEASURING PRODUCTIVITY

UNIT STRUCTURE

7.1 Measuring Productivity
7.2 Measuring the Service Activity
7.3 Significance
7.4 Measurement Of Productivity
7.5 Factors Influencing Productivity
7.6 Productivity Problems and Measurement
7.7 Production and Operations Management-Manufacturing and Service
7.8 Quality Measurement in the Information Age
7.9 Tools and Techniques for Improving Productivity
7.10 Answers to Check Your Progress
7.11 Review Questions

UNIT OBJECTIVES

1. To learn the Various types of Measuring
2. To understand the Productivity Problems and Measurement
3. To learn the Production, operations Management-Manufacturing and service
4. To learn the Quality Measurement, tools and Techniques - Improving Productivity

7.1 MEASURING PRODUCTIVITY

Measuring productivity is some what easier than measuring quality because the latter is determined by the customer and may be fragmented and elusive. On the other hadn, productivity can also be difficult to measure because it is measured by the output of many functions or activities, many of which are also diffucult to define. What is the measurable output of design, market research, training, or quality assurance?

Check your Progress
1. What is productivity?

Despite these difficulties, measures are needer for each activity and in most causes for each individual front-line superviser. Standards are needed for

comparision against past performance, the experience of competitors, and as a basis for action plans to improve.

NOTES

Carl G. Thor, president of the American Productivity and Quality Center in Houston, is a pioneer in the productivity measurement process and has worked for many years on the development of a measurement system. His principles of measurement for both productivity and quality include.

* Meet the customer's need - that person who plans to use it. The cusomter may be external or interna,
* Emphasize feed back directly to the workers in the process that is being measured.
* The main performance measure should measure what is important. This may not be the case with the traditional cost control report.
* Measures should be contraollable and understandable by those being measured. This principle may be enhanced by the participation of those being measured.
* Base measures on available data. If not available. Apply cost benefit analysis. Before generating new data. Information is rarely worth more that the cost of obtaining it.

WHITE-COLLER PRODUCTIVITY

Productivity of white -collar workers is no less important that that of direct labor or manufacturing employees. Indeed, in terms of numbers and expense, staff and non-production employees outnumber production employees by a wide margin. Yet the problem of measurement of output is more elusive measuring the units assembled per men-hour is not too difficult, but now many reports should an accountant prepare, not to mention the most difficult of all measures managerial productivity. Peter Drucker tells us that it is "usually the least known, least analyzed, least managed of all factors of productivity."Research has shown that white-collar employees are productive only about 5- percent of the time. The remainder is non-productive time and can be traced to personal delays(15 percent) and improper management(35 percent). Causes of wasted time include:

* Poor scheduling
* Poor staffing slack start and quit times.
* Slack start and quit times.
* Inadequate communication of assignments

* Lack of communication between functions.
* Unproductive meeting and telephone conversatior
* Information overlaod

NOTES

7.2 MEASURING THE SERVICE ACTIVITY:

Although the manufacturing worker(one who physically alters the product) has been measured for decades by time standards, time studies, and work sampling, It is not as easy to set standards for the non manufacturing employee or the service activity. It is is unlikely that measurement can be achieved in the same way as is done for the manufacturing workers. Nevertheless, a system can be devised to describe the productivity of an activity at a point in time and then provide a baseline for judging continuous improvement over time. The system is particularly appropriate for multi-divisional companies with similar products or services and for individual companies with an industry.

The basis for a system of measurement starts with the existing functions and activities of the organization. Each activity is a subset of a particular function. For example, the activity of recruiting is a part of the human resource function, accounts receivable is a part of the accounting function, and so on. The typical organization may identify a hundred or more activities that can be grouped into ten or more functions. This concept is shown in figure 10.2.

Check your Progress

2. What are the reasons for less productivity ?

The next step is to identify the output indicators that "drive" the activites or cause work in the activities. IN other words, if it were not for the work caused by or resulting from the indicators, there would be little need for the activities. If for example, there were no purchasing, there would be no need for vendor invoicing. The resources utilized in the activity of vendor invoicing are therefore a dependent variable of the purchasing function. In other words, if activities are the "input"in the productivity ration of output to input, then the indicators are the "output"

ACTIVITY ANALYSIS

1. Measure of an activity out put is not sufficient. Questions still remains:
   1. Is the output/input ration a positive number?
   2. Can this ratio be improved? Most importantly
   3. Does the value added by the activity contribute to the goal of the organization and the external or internal customer?
      1. Is the output/input ratio a positive number?

2. Can this ration be improved? Most importantly

3. Does the value added by the activity contribute to the goal of the organization and the external or internal customer?

NOTES

The overwhelming majority of people in an organization cannot answer of these questions. Except in general and non-measurable terms. They define their activities in terms of what they are doing. not what they want to get done or whether the output is worth more than the input.

People characterized as input supervisors or employees are recognized by their dedication to collecting voluminous data for variance reports or closely examining the details of pense account. The emphasis is on paperwork and the maintenance or records.They are the guardians of company rules and procedure. But are unconcerned about the value of their service to external or internal customers. The means becomes the end. Emphasis is on form and administration (doing things right) rathe than process and result.(doing the right things). They confuse efficency with effectiveness. The design department is efficient at marketing repeated modifications to the product without regard for the impact on production. The sales force is efficient at calling on the wrong customers with the wrong product. Staff department are efficient at providing services to internal customers who place no value on the service because they do not have to pay for it the. The force is on the budget rathe than results.

Activity-focused supervisors and employees are intent on what they are doing, as opposed to what should be done. The accountant focused on preparing the cost report rather than reducing overhead cost. The engineer is concerned only with the technical specifications of design without regard to cost, value analysis, or competitive considerations. When asked to define the results of their jobs, these people will reply with such platitudes as "improve the operations,Keep maintenance cost down, "or "stay within the budget."It can be said of bureaucracy that focus on activity rather than results seems perfectly logical to those who are trapped within it. The activity may seem logical to the individual performing it, but to an outsider or a customer it is obviously wasteful.

The Historical attention that is paid to budgets and cost control encouraged a focus on activity rather that non-financial measures that plan and monitor sources of competitive value and strategic cost information. For most white-collar and service activities, the purpose of the output is to provide input to another down stream activity that can be viewed as the internal customer. A good starting point, therefore, is to determine whether the internal customer's

expecations is met by the value provided by the upstream activity. The analysis of these activities begins by charting the flow throughout the organization and identifying sources of customer value in each. The central questions to be asked are what is that value added by the activity and what is the out put worth to the supplier and receiver.

NOTES

The major steps in conducting an activity analysis program include:

* Each unit, function, or activity develops a base line budget that includes a break down of one year's costs.
* Set a cost, productivity, or quality target.
* Develop a mission statement for each unti that answers the question: "Why does it exist?
* Identify each activity that supports the mission and the end products or services that results from that result from that activity.
* Allocate end-product cost that equals the baseline budget.
* Identify receivers (customers) of the end product or service.
* Develop and implement idea for improvement.

PRODUCTIVITY

Productivity refers to the physical relation between the quality produced (output) and the quantity of resource used in the course of production (input).

Output implies production while input means land. labour. capital. management etc. Productivity measures the efficiency of the production system. Higher productivity means producing more from a given amount of input or producing a given amount with minimum level of inputs.

In other words the more the output from one worker or one machine (or a piece of equipment) per day per shift, the higher is the productivity. Higher productivity is not to be taken in sense of higher workloads or faster machines alone but it is always elimination of waste of all type of labour (time and skill) machine time, capital, and material management etc.

Productivity = Output per unit of input

Productivity and production are two different terms. Productivity is a relative term indicating the ratio between total output and the total inputs used therein on the other hand production is an absolute concept, which refers to the volume of output. The volume of production may increase but productivity may decline due to inefficient use of resource. Efficient use of input may increase productivity but the volume of production may not increase. Produc-

tion refers to the end result of production system whereas productivity reflects its efficiency.

NOTES

7.3 SIGNIFICANCE

Benefits derived from higher productivity are as follows:

1. It helps to cut down cost per unit and thereby improve the profits.

2. Gains from productivity can be transferred to the consumers in from of lower priced products or better quality products.

3. These gains can also be shared with workers or employees by paying them at higher rate.

4. A more productive entrepreneur can have better chances to exploit export opportunities.

5. It would generate more employment opportunities.

7.4 MEASUREMENT OF PRODUCTIVITY

Productivity may be measured either on aggregate bases or on individual basis, which are called total and partial productivity respectively.

Check your Progress

3. How service can be measured?

Total Productivity Index= total outputs / total inputs

$$\frac{\text{total production of goods and services}}{\text{labour + material+ capital+ Energy+Managed}}$$

This index measures the efficiency in the use of all the resources.

Partial productivity Indices, depending upon factors used, it measures the efficacy of individual factor of production. Following are productivity indices for individual inputs.

Labour Productivity Index = output in unit / man pours worked

Management Productivity Index = output unit / total cost of management

Machine Productivity Index = total output / machine hours worked

Land Productivity Index = total output /area of land used

7.5 FACTORS INFLUENCING PRODUCTIVITY

Productivity is outcome of several interrelated factors, which may broadly be divided into two categories- human factors and technological factors.

1. Human Factors: Human nature and human behaviour are the most significant determinants of productivity. Human factors include both their ability as well as their willingness:

(a) Ability to work: Productivity of an organization depends upon the competence and caliber of its people-both workers and managers Ability to work is governed by education, training, experience, aptitude, etc. of the employees.

(b) Willingness to work: Motivation and morale of people are very important factors that determine productivity. These are affected by wage incentive schemes, labour participation in management, communication systems, informal group relations, promotion policy, union management relations, quality of leadership, working hours, sanitation, ventilation, subsidized canteen, company transport, etc.

2. Technological Factors: Technological factors exert significant influence on the level of productivity. These include the following:

(a) Size and capacity of plant

(b) Product design and standardization

(c) Timely supply of materials and fuel

(d) Rationalization and automation measures

(e) Repairs and maintenance

(f) Production planning and control

(g) Plant layout and location

(h) Materials handling system

(i) Inspection and quality control

(j) Machinery and equipment used

(k) Research and development

(l) Inventory control

3. Managerial factors: The competence and attitudes of managers have an important bearing on productivity. In many organizations, productivity is low despite latest technology and trained manpower. This is due to inefficient and indifferent management. Competent and dedicated managers can obtain extraordinary results from ordinary people. Job performance of employees depends on their ability and willingness to work. Management is the catalyst to create both.

NOTES

Check your Progress

4. How productivity can be measured?

Advanced technology requires knowledgeable workers who in turn work productively under professionally qualified managers. No ideology can win a greater output with less effort. It is only through sound management that optimum utilization of human and technical resources can be secured.

4. Natural Factors: natural factors such as physical, geographical and climate conditions exert considerable influence on productivity, particularly in extreme climates (too cold or too hot) tends to be comparatively low. Natural resources like water, fuel and minerals influence productivity.

5. Sociological Factors: Social customs, traditions and institutions influence attitudes towards work and job. For instance, bias on the basis of caste, religion, etc., inhibited the growth of modern industry in some countries. The joint family system affected incentive to work hard in India. Close ties with land and native place hampered stability and discipline among industrial labour.

6. Political Factors: Law and order, stability of Government, harmony between States, etc. are essential for high productivity in industries Taxation policies of the Government influence willingness to work, capital formation, modernization and expansion of plants etc. Industrial policy affects the size, and capacity of plants. Tariff policies influence competition. Elimination of sick and inefficient units also helps to improve productivity.

7. Economic Factors: Size of the market, banking and credit facilities, transport and communication systems, etc. is important factors influencing productivity.

7.6 PRODUCTIVITY PROBLEMS AND MEASUREMENT

Undoubtedly, productivity is one of the major concerns of managers.

Productivity Problems

Productivity implies measurement. Although, there is a general agreement about the need for improving productivity, there is little consensus about the fundamental causes of the problem and what to do about them. The blame has been assigned to various factors. Some people place it on the greater proportion of less skilled workers with respect to the total labor force, but others disagree. Another reason given for the productivity dilemma is the growing affluence of people, which makes them less ambitious. Still others cite the breakdown in family structure, the worker's attitude, and govt. policies and regulations. Increasingly, attention shifts to management as the cause of the problem-as well as the solution.

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Measurement of Productivity of Knowledge Workers

Productivity is the input-output ratio within a time period with due consideration for quality. Measurement of skills work is relatively easy, but it becomes more difficult for knowledge work. Thus person on the production line would be considered a skills worker, while the assistant to the manager with planning as his or her main function would be a knowledge worker. Managers, Engineers and programmers are knowledge workers. In general productivity of the knowledge workers is more difficult to measure than that of the skills worker. One difficulty in measuring the productivity of knowledge workers is that some outputs are really activities that help achieve end results. Still another difficulty is that the quality of the knowledge workers output is often hard to measure. Productivity improvement is achieved by the good management practice.

7.7 PRODUCTION AND OPERATIONS MANAGEMENT-MANUFACTURING AND SERVICE

One of the major areas in any kind of enterprise is production and operation management. In the past, production management was the term used to refer to those activities necessary to manufacture products. However, in recent years, the area has been generally expanded to include such activities as purchasing, warehousing, transportation and other operations from the procurement of raw materials through various activities until a product is available to the buyer. The term operation management refers to activities necessary to produce and deliver a service as well as physical product.

> *Check your Progress*
>
> 5) What are the tools to improve productivity?

7.8 QUALITY MEASUREMENT IN THE INFORMATION AGE

Quality concepts are not just for products it is also equally applicable to services. This means such things as the measurement of expectations, experiences and emotions. Software package quality does not only include reliability but also technical support services, compatibility, upgradeability of the software and the integration of the information infrastructure not only with the company but also with its suppliers and customers. Focusing on the quality of the information infrastructure is critical for company success in the new information age.

7.8.1 Operations Management Systems

Operations management has to be seen as a system of inputs, transformation process, outputs and external factors. Inputs include needs of customers, information, technology, management and labor, fixed assets and variable

assets that are relevant to the transformation process. Managers and workers use the information and physical factors to produce outputs. The transformation process incorporates planning, operating and controlling the system. There are many tools and techniques available to facilitate the transformation process. Outputs consist of products and services and may even be information, such as that provided by a consulting organization. Operations are influenced by external factors such as safety regulations or fair labor practice. Thus operation management is an open system interacting with its surroundings.

Planning Operations

Objectives, premises and strategies of an enterprise determine the search for and the selection of the product or service. After an end product has been selected, the specifications are determined and the technological feasibility of producing it is considered. The design of an operations system requires decisions concerning the location of facilities, the process to be used, the quantity to be produced, and the quality of the product.

7.8.2 Special Interest in a Product Decision

One of the basic decisions an enterprise makes is selecting a product or products it intends to produces and market. This requires gathering product ideas that will satisfy the needs of customers and contribute to the goals of the enterprise while being consistent with the strategy of the firm. In a product decision, the various interests of functional managers must be considered. The divergent interests of these functionally oriented managers and professionals influence what product will be produced and marketed, but it is the general manager who has to integrate the various interests and balance revenues with costs, profits with risks and long-term with short-term growth.

7.8.3 Product and Production Design

Following are the steps:

1. Create product ideas by searching for consumer needs and screening the various alternatives.
2. Select the product on the basis of various considerations, including data form market and economic analysis and make general feasibility study.
3. Prepare a preliminary design by evaluating various alternatives, taking into consideration reliability, quality and maintenance requirement.
4. Reach a final decision by developing, testing and simulating the process to see if they work.

- Decide whether the enterprise's current facilities are adequate or if new or modified facilities are required.

6. Select the process for producing the product; consider the technology and the methods available.
7. After the product is designed, prepare the layout of the facilities to be used, plan the system of production and schedule the various things that must be done.

7.8.4 System Design

One alternative is to arrange the layout in the order in which the product is produced or assembled e.g. a truck assembly. A second alternative is to lay out the production system according to the process employed e.g. in a hospital, specific steps are likely to be followed: the admission of the patient, the treatment of the patient (which involves sub-processes), billing for service, and dismissal and may be post-hospitalization treatment. A third kind of layout (sometimes called fixed-position layout) the product stays in one place for assembly. This layout is used for the assembly of extremely large and bulky items. The forth kind of layout is arranged according to the nature of the project. Building a bridge or tunnel is normally a one-time project designed. In fifth kind of layout the production process is arranged to facilitate the sale of products. A six basic approach to production layout is to design the process so that it facilitates storage or movement of products. Storage space is costly, and an effective and efficient design can keep the storage costs low.

7.8.5 Operating the System

After a product has been selected and the system for producing it has been designed and built, the next major step is to operate the system. This requires setting up an organization structure, staffing the positions and training people. Managers are needed who can provide the supervision and leadership to carry out activities necessary to produce desired products or provide services. The aim is to obtain the best productivity ratio within a time period with due consideration for quality.

7.8.6 Controlling Operations with Emphasis on Information Systems

Controlling operations requires setting performance criteria, measuring performance against them, and taking actions to correct undesirable deviations. Thus, one can control production, product quality and reliability levels, inventory levels and workforce performance.

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7.9 TOOLS AND TECHNIQUES FOR IMPROVING PRODUCTIVITY

Tools and techniques include: inventory planning and control, just-in-tie inventory system, outsourcing, operational research, value engineering, work simplification, quality circles, total quality management, lean management, computer-aided design, computer-aided manufacturing and manufacturing automation protocol.

7.9.1 Just-in-Time (JIT) Inventory System

In this system, the supplier delivers the components and parts to the production line "just-in-time" to be assembled. Other names for this or very similar methods are zero inventory and stockless production. In JIT, the quality of the parts must be very high also there must be dependable relationships and smooth cooperation with suppliers. Ideally suppliers should be located near the company.

7.9.2 Outsourcing

Outsourcing means that products and operations are contracted to outside vendors that have expertise in a particular area. The aim may be to reduce costs by saving on personal benefits. Outsourcing is an important tool for a company to make it grow and to maintain a competitive position. It enables a firm to focus on its core competencies and let outside companies do what these firms can do best. For example, Nike, is using outsourcing for all of its shoe production, and only keeps the production of the sophisticated Nike Air system. Other reason of using outsourcing is gaining access to the best sources available worldwide, sharing of risks between the firm and its suppliers, allocating capital to key success factors, outsourcing functions that are difficult to manage, or a firm just may not have the capability to carry out certain tasks. Outsourcing may also serve as a strategic weapon. It has been suggested that before deciding on outsourcing, a business-practice-reengineering study should be conducted. The finding of this analysis may indicate which tasks are best suited for being continued within the company and which should be contracted to an outside source.

7.9.3 Operation Research

Operation Research is the application of scientific methods to the study of alternatives in a problem situation. with a view to obtaining a quantitative basis for arriving at a best solution. Thus, the emphasis is on scientific method, on the use of quantitative data, on goals, and on determination of the best

means of reaching the goals. It is also called as "Quantitative Common Sense"

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7.9.4 Value Engineering

Value Engineering consists of analyzing the operations of the product or services, estimating value of each operation, and attempting to improve that operation by trying to keep cost low at each step or part. The following steps are suggested:

1. Divide the product into parts and operations.
2. Identify the costs for each part and operation.
3. Identify the relative value of the contribution of each part to the final unit or product.
4. Find a new approach for those items, which appear to have a high cost and low value.

7.9.5 Work Simplification

Work Simplification is the process of obtaining the participation of workers in simplifying their work.

7.9.6 Quality Circles

Quality Circles (QC) is a group of people from the same organizational area who meet regularly to solve problems they experience at work. Quality Circles evolved from suggestion programs. In Work Simplification and Quality Circles workers participate in solving work-related problems.

7.9.7 Lean Manufacturing

Lean Manufacturing emphasizes on continuous improvements with strategic breakthroughs. It aims at zero defects, just-in-time inventory system and recognizing everyone is responsible for problems; especially management.

7.9.8 Computer-aided Techniques

Product design and manufacturing have been changing greatly, largely because of the application of computer technology. CAD/CAM help engineers design products much more quickly. Capturing the market quickly is crucial in very competitive environment.

7.10 ANSWERS TO CHECK YOUR PROGRESS

1. Productivity is a ratio of production output to what is required to produce it (inputs). The measure of productivity is defined as a total output per one unit of a total input.

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2. Poor scheduling . Poor staffing slack start and quit times. Slack start and quit times.

   Inadequate communication of assignments. Lack of communication between functions.

   Unproductive meeting and telephone conversations

3. Service can be measure by the activity analysis. The main objectives are set first then the outcome of the activity is measured against the positive or negative feedback.

4. Total productivity index, labor productivity index, management productivity index. machine productivity index.

5. JIT. Outsourcing. operations research. value engineering. work simplification. quality circles and lean manufacturing.

REVIEW QUESTIONS

1. How do you measure the service activity?
2. Explain the significance of productivity in TQM
3. What are the factors influencing productivity ?
4. Write a note on value engineering?

RE-ENGINEERING

NOTES

UNIT STRUCTURE

8.1 Re-engineering
8.2 Principles of Re-engineering:
8.3 The Cost of Quality
8.4 Three Views of Quality Costs
8.5 Japan: New Strategies for a New Reality
8.6 Employee Involvement at Bay City Machine Tool Company
8.7 Putting Deming's Principles to Work
8.8 Continuous Process Improvement At Brooktree
8.9 Computer Chip Prouduction
8.10 Total Quality Management Background
8.11 Quality Function Development
8.12 Answers to Check Your Progress
8.13 Review Questions

UNIT OBJECTIVES

1. To learn the Re-Engineering. Principles and Cost of Quality
2. To understand the Japan - New Strategies
3. To learn the Employee Involvement, Putting Deming's Principles
4. To learn the Continuous Process Improvement, Computer Chip Production
5. To learn the TQM Background, Quality Function Development

8.1 RE-ENGINEERING

It has been suggested that in order to reinvent their companies. U,.S.managers need to abandon the organizational and operational principles and procedures they are now using and create entirely new ones. These new ones can be combined into an emerging idea called business re-engineering. Michael Hammer and James Champy, authors of Reengineering the corporation. A Manifesto for Business Revolution, call it the next revolution of business and compare its impact with that of Adam Smith's concept of labor specification.

This managerial idea fits right in with the twin concepts of quality and productivity. Indeed, reengineering, also called process redesign, holds promise for improving quality and productivity doing more for less-less investment, less time, and fewer people and also doing it with better quality.

In chapter 9(Organizing for Total Quality Management), the classical principles of organization, which focused on structure and activity rather than outcome, were described. It is true that many, if not most, organizations remain committed to the classical principles of labor specialization and bureaucrativ structure. The work is specialized and fragment. Ork is passed from one person or process to another. Workers never complete a job, nor do they understand theiry contribution to the whole: they just perfor, piecemeal tasks.Traditional process evaluation has focused on fixing the process. Business reengineering means starting all over-starting from scratch. Reorganizing is out: reengineering is in.

Reengineering a process is confusing and frustrating to some managers. They can identity a process but perceive it as one among"islands of processes"which, when combined, make up the organization. The connection between and integration among processes is elusive. More importantly, they focus on tasks, on jobs, on people, and on structure rather than on outcomes. Order processing is viewed as a series of individual tasks in a process-reciving an order form, picking up goods from the warehouse, and so forth -losing sight of the larger objective, which is to get the goods into the hands of the customer who ordered them. The tasks that makeup the process are important, but the customers could care less about them. The customer only wants to know if the process works.

Consider the following scenario at I BM Credit's operations. When a salespersons sold a computer and called to get credit approval,it was important to get the approval rapidly, not only because lending money is a profitable business but also because a delay in approval gave the customer a change to change his or her mind or get credit elsewhere. The salespersons call was received by one of fourteen clerical operators who entered the request on a piece of paper. This was the first of five of five steps involving five departments that bounced the request around for periods ranging from six days to two weeks. Ninety percent of that time involved work sitting in someone's or out basket. When the sales person would call to learn the status of the customers financial deal, the information could not be furnished because the request was lost some where in the five-step chain.

When one manger took a financial request and walked it through all five steps, it was learned that the actual work took a total of only 90 minutes. The remaining six days or so was consumed as the request languished in a queue on a desk awaiting movement to the next desk in the process. After reengineering the process instead of moving the request from office office from desk to desk. From pile to pile, one person called a deal structure)now processes the entiere application from start to finish. There are no handoffs . The resul is that the number of requests handled has increased 100 times.

Reengineering is not reorganizing. It is not new wine in old bottles. It is rejection of the classical concept of labor specification and the engineering of tasks. It is the reinvention of the organization through process redesign.

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Check your Progress

1. What is reengineering?

8.2 PRINCIPLES OF RE-ENGINEERING

Creating new rules tailed to the modern environment ultimately requires a new conceptualization of the business process. However, according to Hammer, reengineering need not be haphazard. Some of the Principles that companies have already discovered while reengineering their business processes can help jump start the effort for others.

Organize around outcomes, not tasks. This principle calls for the use of one person to perform all the steps in a process. Design that person's job around an objective or outcomes instead of a single task. The following is an example of an electronics company which had separate organizations performing each of the five steps between selling and installing equipment.

One group determined customer requirements. Another translated those requirements into internal product codes. A third conveyed that information to various plants and warehouses, a fourth received and assembled the components. And a fifth delivered and installed the equipment. The customer order moved systematically from step to step, but this sequential processing caused problems. The people getting the information from the customer in step 1 had to get all the data needed throughout the process, even if was not needed until step 5. In addition, the many handoffs were responsible for many errors. Finally, any complaints from customers were referred all the way back to step 1, which caused in ordinate delays in customer service. When the company ultimately reengineered, the assemble line approach was eliminated. Responsibility for the various steps was compressed and assided to one person. The customer service representative theis person would oversee the entire process.

The Customer service representative experdites and coordinates the process, much like a general contractor.

Have those who use the out put of the process perform the process.

In an effort to capitalize on the benefits of specification and scale, many organizations established specialized departments to handle specialized processes. Computer-based data and expertise are now more readily available, enabling departments, units, and individuals to do more for themselves. When people closes to the process perform it, there is little need for the overhead associated with managing it. Interfaces and liaisons can be eliminated, as can the mechanisms used to coordinate those who perform the process with those who use it. Moreever, the problem of capacity planning for those who perform the process is greatly reduced.

Subsume information processing work into the real work that produced the information. The previous two principles were used to compress linear process. This priniciple suggests moving work from one person or department to another. Most companies establish units which do nothing but collect and process information created by other departments. This arrangement reflects the old rule about specialized labor and the belief that people at lower levels are incapable of acting on information they generate. An accounts payable department collects information from purchasing and receiving and reconciles it with data provided by the vendor. Quality assurance gathers and analyzes information recived form (which produces the information about the goods received)process this information instead of sending it to accounts payable. The new system can easily compare the delivery with an order and initiate appropriate action.

Treat geographically dispersed resources as through they were centralized. The conflict between centralization and decentralization is that decentralizing resource gives better service to those who use it. but at the cost of abundance and missed economies of scale. Companies no longer have to make such trade-off. They can use databases,telecommunication networks, and standard processing systems to realize the benefits of scale and coordination while maintaining the benefits of flexibility of service.

Link parallel activities instead of integrating their results. This priniciple seeks to

Forge the links between functions and to coordinate therm while their activities are in process rather than after they have completed. Communication

networks,shared databases, and teleconferencing can bring independent groups together so that coordination is on going.Put the decision point hwere the work is performed, and build control into the process. In most organizations, those who do the work are distinguished form those who monitor the work and make decisions about it. The tacit assumption is that the people actually doing the work have neither the time nor the inclination to monitior and controlthe work and therefore lack the knowledge and scope to make decisions about it. The entire hierarchical management structure built on this assumption. Accountants, auditor,s and supervisiors check, record, and monitor and the managers handle any exceptions. The new priniciple suggest that the people who do the should make decisions and that the process itself can have built in controls. Pyramidal mananagement layers can therefore be compressed and the organization flattened.

Capture information once and at the source. This last rule is simple,"When information was difficult to transmit, it made sense to collect it repeatedly. Each person, department, or unit had its own requirements and forms. Compnaies simply had to live with the asssocited delays, entry errors, and costly overhead. However, by integrating and connecting these systems, the company was able to eliminate this redundant date entry, along with the attendant chicking functions and the seemingly inevitable errors.

Cost of Quality defined:

The cost of quality has been defined in a number of ways, some of which include:

- At 3M quality cost equals actual cost minus no failure cost. That is , the cost of quality is the diference between the actual cost of making and selling products and services and the cost if there were no failures during manufacture or use and no possibility of failure.
  - Quality costs usually are defined as costs incurred because poor quality may or does exist.
  - The cost of not meeting the customers requirements-the cost of doing things wrong.
  - All activities that are carried out that are not needed directly to support department(quality)objectives are considered the cost of quality.

These definitions leave unanswered the question."How much quality is enough?" In theory, the answer is anaiogous to a priniciple of economics:

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basic maraginal cost equals marginal revenue(MC=MR). That is spend on quality improevements until the added profit equals the cost of the acihieve it. This is not so easy in practice. In economics, the MC and MR curves are difficult to define and more difficult to compute. The same is true of the cost benefit curves of quality cost. What are the costs of added quality and the "hidden"costs of non-quality? What are the bottom line benefits? Neither of these questions is easy to answer, particularly in view of the long-run strategic implications. The answer lies at the very essence of what the company is about.

8.3 THE COST OF QUALITY:

Check your Progress

2. What is cost of quality?

The cost of quality or, more specificatlly,"non-quality" is a major concern to both national policy makers as well as individual firms. Because much of our national concern with competitiveness seems to be focused on Japan, It is interesting to note that some estimates of quality costs in U.S firms indicate 25 percent of revenues, while in Japan the figure is less than 5 percent. Estimates of potential saving are as high as $300 billion bynationwide application of total quality management (TQM). Feigenbaum puts the estimate at 7 percent of the gross national product and suggests that this figure can be one of the tools used by policymakers in considering the quality potential of the U.S. economy in relation to the country's major competitors.

The cost of poor quality in individual firms and the potential for improvements can be staggering. The thriving on chaos, Tom Peters reports that experts agree that poor quality can cost about 25 percent of the personnel and assets in a manufacturing firm and up to 40 percent in a service firm. There appears to be general agreement that the costs range between 20 and 30 percent of sales.

The potential for profit improvement is very substantial. One has only to visualize a profit and loss statemtn with a net profit orf 6 percent before tax and then ocmpute what the profit would be if 20to30 percent of the operating budget were reduced. Add to this the additional strategic benefits and the potential is great indeed.

8.4 THREE VIEWS OF QUALITY COSTS:

Histrocially, business managers have assumed that increased quality is accompanied by increased cost, higher quality meant higher cost. This view was questioned by the quality pioneers. Juran examined the economics of quality and conclude that benefits outweighed costs Feigenbaum introduced "Total

quality control" and developed the principle that quality is everyone job, thise expanding the notion of quality cost beyond the manufacturing function. In 1979 Cro9sby introduced the now popular concept that "Quality is free"Today, the view among practitioners seems to fail into one of three categories.

1. Higher quality means higher cost: Quality attributes such as performance and feautures cost more in terms of labor, material,design, and other costly resources. The additional benefits frin improved quality do not compensate for the additional expense.
2. The cost of improving quality is less than the resulting savings: the view was originally promoted by Deming and is widely held among Japanes manufacturers. The saving result from less rework, scrap, and other direct expenses related to defects. This is said to account for the focus on continuous improvement of processes in Japanese firms.
3. Quality costs are those incurred in excess of those that would have been incurred if the product were built or the service performed exactly right the first time. This view is held by adherents of the TQM philosophy. Costs include not only those that are direct. But also those resulting from lost customers. lost market share; and the many hidden costs foregone opportunities no identified by moder cost accounting systems.

The attention now being given to the more comprehensive view of the cost of poor quality is a fairly recent development. Even today, many companies tend to ignore or downplay this opportunity because of a continuing focus on production volume, or frustration with the problem of computing the trade-off between volume and quality. This computational difficulty is compounded by accounting systems that do not recognize the expenses as manageable. More on this will be provided later in this chapter.

One survey of 94 corporate controllers found that only 31 percent of the firms regularly measured costs of quality, and even among those firms productivity was ranked higher than quality as a factor contributing to profit. Not surprisingly, the major reason for failure to measure these costs was lack of top management commitment.

Philip Crosby, of "quality is free"fame. is of the firm opinion that zero defects is the absolute performance standard and the cost of quality is the price of non-conformance against that standard. His concept is catching on as

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more companies set goals such as parts per million, six sigma, and even zero defects. On the other hand, a goal of zero defects may be more costly than the pay off that might accure. As one approaches zero defects,costs may begin to increase geometrically.

Another of Crosby's principles, which he calls absolutes." is measurement of quality.

The measurement of quality is the price of Nonconformance. not indexes.... Meausring quality by calculating the price of waste-wastes time, effort, material-produces a monetary figure that can be used to direct efforts to improve and measure the improvement.

This monetary figure, according to Crosby, is a percentage of sales, and he suggests that the standard should be reduced to about 2 to 3 percent. This measure has been generally accepted and many firms use it as a target and measure of progress.

QUALITY COSTS:

The costs of quality are generally calssified into four categories.

1. Prevention
2. Appraisal
3. Internal failure
4. External failure

> *Check your Progress*
>
> 3. What are the attributes of quality cost?

Prevention costs include those activities which remove and prevent defects from occurring in the production process. Included are such acitivities as quality planning, production reviews, training and engineering analysis.which are incurred to ensure that poor quality is not produced. Appraisal costs are those costs incurred to identifiy poor quality products after they occur but before shipment to customers. Inspection activity is an example.

Failure costs are those incurred either during the production process (internal) or after the product is shipped(external). Internal failure costs include, such items as machine downtime, poor quality materials, scarp, and rework. External failure costs include returns and allowances, warranty cost, and the hidden costs of customers dissatisfaction as the key quality measure.

The analogy is a good one because the visible 10 percent is comprised of such items as scrap, network, inspection, returns under warranty, and quality assurance costs, for many companies these comprise wht they believe to be the total costs. When the hidden costs of quality are computed, controlled and

,educed, an firm can achieve the benefits shown at eh bottom of figure 11-1.

Of these types of cost, prevention costs should probably take priority because it is much less costly to prevent a defect than to correct one. The principle is not unlike the traditional medical axiom: "An ounce of prevention is worth a pound of cure. "The relationship between these costs is reflected in the 1-10-100 rule depicted in figure 11-2. One dollar spend on prevention will save $qo on appraisal and &100 on failure costs. As one moves align the stream of events from design to delivery or" dock to stock, "the cost of errors escalates as failure costs become higher and the pay off from an investment in prevention becomes greater. Computer systems analysts are aware of this and understand that an hour spend on better programming or design can save up to ten hours of systems retrofit and redesign. One general manager of Hewlett-Pakard's computer systems division observed.

The earlier you detect and prevent a defect the more you can save. If you catch a two cents resistor before you use it and throw it away, you lose two cents. If you don't find it until it has been soldered into a component. it may cost $10 repair the part. If you don't catch the component until it is in the computer user's hands. the repair will cost hundreds of dollars. Indeed, if a$5000 computer has to be repaired in the field, the expense may exceed the manufacturing cost.

When total customer satisfaction becomes the definition of a quality product or service. It creates a need to develop measures which integrate the customer perspective into a measurement system. This need moves beyond the shop floor and into the many non-product features such as delivery time, responsiveness, billing accuracy, etc. This need also leads to a search for the quality. And hence quality costs, in activities not usually recognized as incurring these costs. This will change as more companies realize that all activities can contribute to total customer satisfaction. Thus, quality costs include those factors which lie behind the obvious production processes. Moreover, it becomes necessary to identify the hidden quality costs. Associated with foregone opportunities.

What is frequently overlooked is the unrealized potential for improved productivity and quality to be achieved by identifying and measuring the difference between no failue (parts per million, six sigma, zero process control, improved inventory turn, and reduced cycle time in the many cross-functional processes and cost interrelationship in the stream of activities during the life cycle of the product or a service? Each of these actions would improve qual-

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Check your Progress

4. What is QFD?

ity, use fewer resources, and improve return on investment (ROI). How these same actions could also increase market share and profitability was previously examined in chapter 1. To quote Feingenbanum. "Quality and cost are a sum,not a difference-complementary, not conflicting objectives.

8.5 JAPAN: NEW STRATEGIES FOR A NEW REALITY

Quietly, and with a minimum of discussion, the leading Japanese companies are moving to new business strategies. They are embracing two radically new theories: To do blue-collar manufacturing work in Japan is a gross misallocation of resources that weakens both the company and the national economy. And leadership throughout the developed world no longer rests on financial control or traditional cost advantages. It rests on control of brain power.

The Japanese now hold about 30% of the U.S. automobile market and expect to increase this share substantially in the next few years. Yet they also expect to stop exporting Japanese made cars to the America market with in the next three to five years. By 1995 or so, most Japanese marques sold in the U.S should be manufactured in North American plants.

Similarly, the Japanese expect to have something like one-third of the auto mobile market of the European Economic Community by the year 2000(whatever their present promises to the EC to the contrary), but again without exporting many cars from Japan. And Japanes multinationals-Toyota, Honda, Sony, Matsushita, Fujitsu, the ceramics leader Kyocera, and the Mitsubishi companies-are pouring staggering amounts of money into manufacturing plants in developing countries. They are in Tijunaa on the U.S. Mexican border, through-out South America, in Southern Europe and in Southeast Asia.

The standard explanations for moving manufacturing out of Japan are "foreign protection ism" and "Japan's growing labor shortage". Both explanations are legitimate. But they are also smoke screens. The real reason is the growing conviction among Japan's business leaders and influential bureaucrats that manufacturing work does not belong in a developed country such as Japan.

Before Youngsters can go to work on the assemble line, my Japanese friends say again and again. Japan pours $100,000 in school expenses into them. And then they have to get a middle-class income, life time security, a pension and health care. In Bangkok or in, Tijuana, young sters require very

little capital investment in their educations; and they are middle class if paid 10 the wages of the U.S or Japan. Yet their productivity after proeductivity after two or three years of training is as high in Tijuana or in Bangkok as it is Nagoya or Detroit. When you figure the enormous social capital invested in them. My friends say the return that blue-collar workers make to society in developed countries is at most 1% or 2%. IN Lating America or Indonesia, It's 20 times that.

Whenever I then argue that a country is hightl vulnerable without a strong manufacturing base, they respond that the supply of young people in the developing world will be so large in the next 30 years that it's absurd to worry about the manufacturing base, the way Americans do. Indeed it's my friends" social responsibility to Japan, they say, to make sure that as few as possible of its high-investment. Hight cost young people are being misused for low-yied manufacturing work.

Instead, the new Japanese strategies call for total control of what now matters, To be competitive, the argument goes, Japan requires leadership in technoly, marketing and management, and firm control of what my Japanese friends are beginning to cal"brain capital".

The Japanese are willing to pay large sums to gain access to knowledge-through a minority participation in a silicon Valley computer specialist: through similar investments in U.S. and European pharmaceutical or genetics entrepreneurships: above all, thorugh financial research in western(mainly U.S) universities. The direct financial return is usually zero. But the Japanese are paying not for dividends but a access to the knowledge their partners will produce, and control over it-or at least priority in using it.

Increasingly Japanese companies employ foreigners in their international operations, both as professional and as executives. The large Japanese auto makers now all have design studios in Southern California and Westerners running their international marketing. But the use of the knowledge these foreigners produce is "proprietary" and tightly held with in the Japanese management team,. And while in the past some Japanes companies granted licenses on their knowledge to western companies.e.g. on some Japanes-developed cardiac drugs-they are now revoking or not renewing them.

Every major Japanese industrial group now has its own research institute, whose main function is to bring to the group awareness of any important new knowedge-in technology, in management and organization, in marketing,

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in finance.in training-developed world-wide. On my last trip to Japan. a few months ago. I spoke at the 20th anniversary of one of these thing tanks. that of the Mitsubishi Group. At lunch after my talk. one of the most respected elders of the Mitsubishi clan said to me. In another 20 years the entire Mitsubishi Group will be organized around this research institute.

Every body now knows that the Japanese can bring out a new product in half the time it takes their American competitors and in one-third the time it takes the Europeans. And everybody also knows that major U.S companies are recognizing their research and development work the Japanese mode. along cross-functional lines. But the Japanese are already moving to the next stage.

They are reorganizing R&D so that is simultaneously produces three new products with the effort traditionally needed to produce one. Any they do this by starting out with a deadline of abandoning today's new product on the very day it is first sold. The faster we can abandon todays new product. the stronger and the more profitable we will be is the new motto.'

To most western businessmen. this is madness. They believe that a product becomes more profitable the longer its product life-for than the money spent on developing it has been writtern off. But "wring off to the Japanes is useful to cut taxes but otherwise self-delusion.

Money spent on developing a product or a process is not" investment" to the Japanes. it is sunck cost". But the main reason the leading Japanese businesses are now shifting the life cycle of their products is their conviction that the only alternative is for a competitor to do so and then the competitor will have not only the profits but the market.

My Japanese friends acknowledge that some Western companies-3M. for example have long operated on the policy that 70% of their sales five years hence will have to come from products that do not exist today. But these companies rely on a spontaneous upswelling of entrepreneurship from within.

By deciding in advance that they will abandon a new product within a given period of time, the Japanese force themselves to go to work immediately on replaceing it. and to do so on three tracks:

One track("Kaizen") is organized work on improvement of the product with specific goals and deadlines-e.g., a 10% reduction in cost within 15 within 15 months and / or a 10% improvement in reliability within the same time, and /or a 15% increase in performance characteristics-and enough in any event

to result in a truly different product. The second track is "leaping"-developing a new product out of the old. The best example is still the earliest one: Sony's development of the walkman out of the newly developed portable tape recorder. And finally there is genuine innovation.

Increasingly, the leading Japanese companies organize themselves so that all three tracks are pursued simultaneously and under tha direction of the same cross-functional team. The idea is produce three new products to replace each present product. With the same investment of time and money - with one of the three then becoming the new product leader and productin the innovator's profit.

Finaly, the leading Japanese companies are moving from Total Quality Management to Zero Defects Management. "We can't use TQM", one of the top manufacturing people at Toyota recently said"At its very best" and no one has reached that yet-it cuts defects to 10%. But We turn our four million cars, and 10% defect rate means that 4000000 Toyota buyers get a 100% defective car. But Zero defects management is now possible and actually not too difficult.

What the Japanese now practice is very much a return to Frederic Tayolor's Scientific Management. Only the operators themselves. Rather than the industrial engineer. Take the initiative in studying the task, the work and the tools. And instead of stopwatch and camera they use computer simulation.

What triggered this shift was an American import: the huge and hugely successful Disneyland that opened outside of Toky,."We all knew that it would take Disney three years to work the bugs out of the huge undertaking a leading Japanese industrialist told me. "Instead, It ran with zero defects the day it opened. Every single operation had been engineered all the way through and simulated on the computer and trained for - and it suddenly dawned on us that we could do this too.".

Since the mid-1980s, he said, American firms have been rushing to install TQ. "That I ll take 10 years before it really works at least that's what it took here. This means it will work in America around 1995. By that time we will have Zero Defects Management and will again be 15 years ahead of you".

These new Japanese strategies may not work. Or they may work only for the Japanese. But even if they are the wrong responses, they are at least responses to reality the emergence of the highly competitive and world wide knowledge economy.

8.6 EMPLOYEE INVOLVEMTN AT BAY CITY MACHINE TOOL COMPANY:

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Bay city Machine Tool company is a manufacturer of machine tools and chuck jaws for the manufacturing industry. Although 80 percent of production goes to customers in the aero. Space and automobile industry, the company is trying to expand its product line and customer base to a variety of other applications.

The company was founded in 1964 in Bay City, Michigan, Bob parsons, founder and CEO moved the home office to Fort Lauderdala, Florida in 1979 in order to acjoeve a life style of sun and surf." Persons was also a boating enthusiast. The main plant was still located in Bay Cit, with additional plants in Fort Lauderdale and San Juan, Puerto Rico. Only the main plant was unionized.

Parsons was concerned about the recent changes in the machine tool industry. His product line and historically been comprised of high-spped steel drills which were now approaching commodity status. New materials, technologies, and , and methods were reducing the demand for the company's bread-and-butter products. Titanium nitride coatings and carbide-tipped tools had a longer wear life and were priced higher. Lasers were increasingly being used as a cutting medium, and a shift from fastening to bonding of metal parts eliminated the need for drills.Thus, the company was faced with the dual problems of updating a product line and modernizing the manufacturing equipement and methods to meet the increased demand for high-quality specifically tools.

During the late 1980s and early 1990s, the machine tool industry was hit particularly had by a combination of foreign competion, the worldwide recession, and the strength of the dollar. Because demand had fallen off considerably, Bay city was required to lay off (downsize) about 25 percent of its work force. It was during this time that the company attempted a change over to a new production line that demanded tighter specifications and machine tolerance and higher quality product. New equipemtn was installed and a few new salespersons were hired.

Not long after the production changeover in the Bay City plant, many of the old-line customers. who themselves had to make the change. Began to complain about quality, price, missed delivery dates and similar related problems not previously encountered. Returns were increasing and accounts receivable began to grow at a rate twice the rate of sales growth. No problems

were encountered at the San Juan plant because that operation as still producing the commodity drills as they had been doing since the plant opened in 1981.

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The situation began to get out of hand in late 1993, when a large order at the Michingan plant was canceld. Bob Parsons decided to go to Bay city to see what could be done to correct this incident and to figure out hoe to improve quality and production levels. He left the fort Lauderdale operation in the hands of his son, BobJr.

Parsons had previously attended a three-day TQM seminar and came away with a conviction that the companies problems could only be solved by getting production employees more involved in problem solving at the shop floor level. He did not know exactly how to implement such an approach, but he knew the something had to be solved by getting production employees more involved in problem solving at shop flower level. He did not know exactly how to implement such an approach. but he knew the something had to be done quickly and effectively. He was aware that a failure to achieve some success and acceptance would doom this and subsequent efforts. On the other hand, he did not trust the shop floor supervisors to cooperate because of their perception that their authority might be circumvented. For this reason, he decided to put the manager of human resources change of the employee involvement effort.

Because a long-standing adversarial relationship existed between the union and the Human resources Development. It was decided that the union should not be involved during the effort. Parsons did not want the union to stop it before it began.

Shortly after his arrival at Bay Cit. Parsons became convinced that part of the problems could be traced to new machines that were necessary for the revised production recess the conviction was based on what he had been told by several shop floor supervisors. The machine manufacturer in turn suggested that the workers had not been adequately trained and offered to conduct training for supervisors, who would than train their workers. No concessions or reductions in production schedules were made however.

Based on what he learned during his visit and what he already knew. Parsons summarized the situation:

* According to an attitude survey conducted by Human Resurces Department,worker satisfaction had been declining and had reached an all-time low.

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Check your Progress

5. What is the contribution of Deming to tqm?

* The supervisor were generally of the opinion that many of the problems were the fault of the workers who did not care about quality. All supervisors had previously been shop floor workers.
* The focus had historically been on getting out the production, and this remained the focus under the new production system. Compensation was tied to production labels. It was assumed that any quality problems would that any quality problems would be solved by the Quality control Department.
* Outside industrial engineers had developed specific and detailed work procedures and job standards for each job on the floor. Work was organized around a traditional assembly line.
* The chain of command went from the vice president of manufacturing (in fort Lauderdale), to the plant manager, to the superintendent of production, to department managers to shift supervisors, and finally to workers.

8.7 PUTTING DEMING'S PRINCIPLES TO WORK

Before I joined Saving corp., I spend 10 Years Working with W. Edwards Deming while he was consulting with my previous employer Mr. Deming's statistical approach to quality helped get Japanese industry back on its feet after. World War II and, to borrow a phrase, the rest is history. In the 1990s. this total quality approach will make history again. Not in Japan, and not manufacturing, but in the service industry.

The service sector in the U.S in 1991 bears an eerie resemblance to American manufacturing 10 or 15 years age. Costs are high. Profit margins are narrowing Quality standards the inconsistent at best, and competitive pressures are mounting each year.

A Deming-style "total quality management "approach to improving service quality is rooted to the unglamorous and never fashionable discipline of statistics. I speak from Savin's experience in the coper industry. Where a companies fortunes ride on the quality of its service. Using Mr Deming's statistical approach to total Quality Here are some examples of how it was done.

"Call backs."are anathema to every business that sends technicians on service calls. A customer callback menins the job waste completed right the first time. and the service provided has to eat the cost of a second visit. Early last year. a careful study by Saving found that the call backs were related to

deficient in our traing process. One of the Branch managers suggested stripping our dealer trading centers of their instructions, so we could run marathon training programs for all of our branch technicians.

While the approach could have corrected our call back problem, the time and expenses involved had the potential to outrun the cost of making the call back, in addition to disrupting dealer support. To find an affordable solution that would reduce call backs sharply at an affordable cost, we turned to the tools of statistical analysis.

I asked our branch service managers to prepare a Pareto diagram of callbacks for each field engineer. The Pareto principles states that cause and effect are not linerly related. Three ususlly will be a few causes-20% or fewer by volume-that will account for 80% of fewer by volume-that will account for 80% or more of the effect.

Using the Pareto principles against our call back problems in one branch showed that if we retrained only five field engineers. Those with the record number of call backs. We could drop the branch average for call backs by 19% or Retracing five engineers was a lot less daunting than retrained only five field engineers-those with the record number of call backs situation got out of control again. This was a case where using a statistical tool focused our corrective action to whre it was needed, and helped us reduce waste at an affordable cost.

In technical service business, small details gone awry can collectively kill productivey and drain the profitability form a service call. We found, for instance, that significant time was being wasted on service calls when our engineers had to go back to their vechicles for spare parts it is physically unrealistic and impractical to expect a field engineers to carry every conceivable part it is physically unrealistic and impractical to expect a field engineer to carry every conceivable parts. It is physically unrealistic and impractical to expect a field engineer to carry every conceivable part that might be needed Considering, however, the salaries paid to skilled technicians, the time they spent shutting back and forth for parts represented some of the most expensive trave in corporate America.

By using statistical analysi, we were able to cretermine those parts that the engineers were most likely to use on a call. We were able to assemble a call kit containg those parts with the highest probability for use, and that is what our field engineers began carrying onto customers premises. The result

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was a significant decrease in the time spent retrieving extra parts. And we are able to make more service calls, which delights Savin.

Even a problem as well as tiny screws being occasionally dropped into machines during service call can be helped by statistical analysis. When we studied the variation found the service call process, we were able to quantity the time being wasted retrieveing those little screws. As a result, we equipped each technician with a maganetic screwdriver and the problems of way ward scres was virtually eliminated.

One should not conclude that toal quality management and statifical analysis are the excuse that should permeate every job in the service industry. For that reason, I have taught against designating TQM as a "Program" at Saving. Programs tend to be finite efforts that get the against designating TQM as a "Program if the U.S. Service industry is to survive and prospér. TQM should be the approach followed by everyone in the industry.

That is not say that a company's TQM resources should not include an in house satisfaction. I know from personal experience that they are hard to recruit. If your company is fortunate enough to have one, that statistician should be one of the busiest people in the company.

8.8 CONTINUOUS PROCESS IMPROVEMENT AT BROOKTREE

In today's highly competitive market places continous improvement is very difficult to achieve because oftentimes no one knows where to begin. Brook free Corporatio's experience provides insights into how continuous improvement can be achieved.

Brook tree corporation designs, develops, and makets a board family of proprietary mixed. Signal VLSI integrated circuits(Computer chips) that solve complex technical problems in computer graphics, imaging, and automatic test equipment(ATE) systems. Brook tree is a leading supplier of RAMDAcs (randon access memory digital to analog converters) that enable vendors of computer workstations, personal computers and laptop computers to offer cost-effective color and grey-scale graphics. These mixed-signal circuits are used by leading computer system manufactures including IBM, Hewlett-Packard, Sun Microsystems, DEC, Compaq, and many others

Brroktree was founded in 1981 by Myron Eichon and Henry Katzenstein,began operations in 1983, shipped its first product in 1985, achieved

profitability in 1988, and went public in 1991.current year's sales were over$ 80 million. Breektree currently emplys approximately 540 people worldwide.

8.9 COMPUTER CHIP PROUDUCTION:

Computer chips are designed at the San Diego development center after one of the Brookfree's strategic Business Units identifiers an opportunity to fill a need in one of the corporations target markets. The design process generally takes from eigh to 18 months

When the design phase is comple, production coccurs in a four-step process. The first stop is the production of the wafers, which contain the die that will become the heart or the "mind" of a computer chip. Brookfree contracts with several "foundries" located in the United states and Japan to product the die used in its products. Secifications for the wafer are communicated to one or more of these"foundaries" that fabricate Brooktree Wafers. Finished wafers are shipped to san Diego where they are tested in the second step of the production process.

In the second step, water probes, all the die in a wafer are test4ed. Bad die are sent to assemble houses that cut the die out of the wafers and package the good ones in the ceramic or plastic packages that form most of the Bulk of a computer chip.

Packaged parts are than sent back to San Diego for final testing. This final testing is considered to be the fourth phases of the production process. The finished goods inventory is maintained in San Dieo. The entire production process- fabrication, proble.assemble. and final test takes about 14 weeks. A flowchart of the process is shown in Figure1.

8.10 TOTAL QUALITY MANAGEMENT BACKGROUND

In mid-1989 Brooktree management commited the company to Total Quality Management and continuous process improvement. Mangers began a sustained efforts to promote the understanding and improvement of the capabilities of the brook tree process. The finished goods inventory in main trained in San Dieg. The entire production process-fabrication, proble, assemble, and final test takes about 14 weeks. A flow chart of the process is shown in Figure1.

Total Quality Management Back ground:

In mind -19+89 Brook free management committed the company to Total quality Management and continuous process improvement. Managers

began a sustained effort to promote the understanding and improvement of the capabilities of the brooktree processes. Many of the initial efforts rocused on classic"factory problems" including inventory and cycle and reduction, imporvment in out going quality, and on-time delivery performance. These efforts have been rewarded with improvements. In some cases dramatic improvements-In these measures.

About the same time, Brook tree management began to focus on forging a closer woking relationship with its many suppliers. This supplier management effort was driven was driven by the knowledge that brroktree's ability to meet the quality, cost, and performance needs of its customers would be determined by its suppliers. In order for Brook tree to perform better, it had to improve the performance e of its suppliers.

Brook free originally had established the Brook tree Foundary Coordination Committee(BFCC) to provide a single foundry interface or point of contact with all foundries. Late in 1991BFCC began to hold quarterly strategy meeting with representatives form various foundries to explore ways in which all foundry groups would work together to improve Brook tree's relationship with them.

When the meeting began, foundries would often take as long as three weeks to commit to a delivery time to Brook tree. Of course, long and inconsistent commitment times make it harder to plan and control operations and respond quickly to customer requirements. Bob Lutze, Brooktree's manager of device engineering, noted, "water ordering is a black hole".

One of the Foundry coordination committee's goals was to reduce the time required for foundries to commit to the dates that water orders would be delivered to Brooktree. The Brooktree contingent-including Quality Assurance Director Ted Holtaway, Manager of Device Engineering contingent-including Quality Assurance Director Ted Holtaway, Manager of Device Engineering Bob Lutze, and Purchasing Manager Claudia Johnson-knew that the first step to solving the long lead-time problem was to understand the way the current process worked. All the steps involved and the linkages or "products" that passed from group to group along the way would have to be understood. If the goal was to determine which steps in the process took the longest and which if any, added no real value to the process.

It soon became apparent that none of the Brook tree personnel or the foundry representatives in question understood the whole process. Although

the group had the collective knowledge to understand and describe the entire process, they never had "talked to each other" regarding the way the process worked. Each individual was expert in one or more of the steps required to get a water order committed, but nobody at the table had a good feel for the "big picture" and how all the pieces fit together.

Before a meaningful improvement effort could get under way, it was necessary to educate everyone in the room regarding the way the whole process worked at the time. A process flow chart was used to try to gather and display the collective knowledge present in the room. The entire flowchart capturing the current process, and the requirements for each step in that process. A "clean"version of theat chart, including standard times, is presented in Figure2.

Often participants in this type of exercise have trouble believing that the process under examination actually, works the way the flowchart suggest it does. It's not uncommon to hear comments such as."That can't be right!" or "We do not really do that, do we?" At this BFCC meeting such comments were made. And such comments are apt to be heard any time a process consists of a series of functions performed by different companies. different companies, different divisions, or even different departments within one company. This lack of understanding occurs any time management focuses on function (production control, customer service, marketing, accounting such comments were made. And such comments are apt to be heard anytime a process consists of a series of functions performed by different companies, different companies, different divisions, or even different departments within one company. This lack of understanding occurs anytime management focuses on function (production control, customer service, marketing accounting)rather than the process of meeting customer needs. This clearly was the case in this instance order commitments generally cross functional axes, managers and their accounting reports will operate in "functional chimneys." These chimneys make it easy for redundancies and inefficiencies in the process to grew and make it difficult if not impossible for these same redundancies and inefficiencies to be detected and ultimately corrected.

Process flow charts are a simply way to begin to understand and communicate how a process actually works. Once one can "see the process "Managers may be able to break down the walls of the functional chimneys and manage the process rather than the pieces.

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Once the current wafer-commit process was visible, the group began devising a plan to reduce the time required to commit water orders. The first flowchart shows that orders were not committed until the wafers had been started. After brief discussion, it became clear to everyone in the group that the time required to commit an order could be reduced by decoupling the commit process from the rest of the process of starting waters. In other words, the two processes could run in parallel instead of serially as they are shown in figure 2. Other changes included reducing the number of approvals required to move from step to step in the process.

The flow chart maps the "improved process". It was expected that the process changes made as a result of this analysis would reduce the time required to obtain foundry commitments. For wafers from 15 to six working days. Thus, what used to require three weeks now requires one week. This 67% reduction in process time is significant.

According to Brook tree participants, there were two characteristic of this improvement effort that made it successful. The first was that all parties recognized that everyone involved brook tree, distributors, and foundries-would benefit from streamlining the process. The second was that all the right people people who knew that current process and who could make decisions regarding changes-were committed to the improvement and participated in the discussions at the meeting.

Committee members also were surprised at how quickly the supplier companies were able to the changes that were necessary to streamline this process. They attributed this quickness. At least in part, to the clear picture that the flowchart provided.

Benefits of flow charting the process

As a result of this exercise, water commit times have been reduced by about 67%. That reduction greatly simplifies the process of planning and managing Brook tree's purchasing and material control activities. It allows better and faster service to the ultimate customers. Because these gains were made by streamlining the process so that it works smarter and is more efficient (as opposed to acceleration by pushing harder). These process changes also should save suppliers time and money. A final result of tthis process changes also should save suppliers time and money. A final result of theis process evaluation and change is a tighter working relationship between brooktree and its suppliers. That should continue to pay dividends, inters of competitiveness for a long time into the future.

Flowcharting and Analysis

One of the key requirements to the successful use of flowcharts as a process improvement tool is captureing the process as it actually works. This information is usually harder to obtain than expected. It is easy to fall into the trap of drawing the process as it should be or as it is assumed to be. But it should make sense that if the goal of the exercise is to improve the process, then neither of those approaches will be as effective as charting the actual process as it currently functions.

People involved in the flowcharting must have a good working knowledge of the process and how it actually works.

Once the chart is drawn,ideas for changing the process often begin to flow spontaneously. But there are some general guidelines or approaches, summarized below, that have proven useful in evaluating flow charts.

General Guidelines

Be sure the flowchart reflects the way that the process actually works. The best way to do that is to have the people who are actually involved in the process develop the chart. Once that real chart is drawn, look for the following:

Steps that requires lost of time or cost. Are they necessary? Are they necessary? Are there better alternatives available?

Bottelnecks or poorly designed steps in the process. Would changes here improve the ability of the process to get its job done?

Critical relationship or interfaces among different groups. How well managed are the interface? How well does the "Product" that is provided by the supplier, or sender, in that relation interfaces? How well does the "product" that is provided by the suppler, or sender, in that relationship meet the needs of the customer, or receiver? Don't guss. Get some data Ask the customer.

Loops in the flow. These indicates that something is being redone (or reworked as it would be called in manufacturing). Because it wasnot done correctly the first time. Find out why that happens, and work to remove tha cause of the problem.

CASE STUDY: QUALITY IMPROVEMENT IN A DIVERSIFIED HEALTH CENTER

Applying industry models of quality improvement to the health care setting made perfect sense to Marie sinioris, corporate vice-president of Rush-Presbyterian-St. Luke's Medical center, Chicago.

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When sinioris began investigating the idea, she had already seen several concepts borrowed from industry-such a strategic planning and product line management successfully app,ied in the health care setting. And she believed that the Rush health system, with its diverse mix of for-profit and not-for profit services, shared many similarities with the industries that had integrated quality management principles.

Sinioris was particularly impressed with the quality management philosophies in place at the Minnesota Mining and Manufacturing (3m) C0., St. Paul.

3M defines quality as a "Consistent conformance with customer expectations." It total quality management (TQM) process requires the commitment of top management and draws on employee insights to discover ways to better meet customer needs.

When sinioris approached 3M for advice in implementing a TQM program, the company had already marketed it TQM process to other corporations. Seniors offered 3 M a new challenge the chance to study how well TQM principles applied to the health care setting in 1987, Rush became 3M's alpha site for testing TQM in health care.

TQM is a complex system. At Tsuh, 3M had the opportunity to test the TQM process in a variety of health care settings. In addition to Rush's urban 983-bed flagship facility, the system includes two suburban hospitals; a health sciences university, Rush Health Plans (which includes an HMO with 16 sites a preferred provider organization, and an independent practice association0' home health nursing service; Arc ventures, a for profit subsidiary that market health care products to corporations and other health care settings; and six occupational health clinics.

The challenge of attaining a uniform standard of quality across Rush's diverse assemblage of organizations has never daunted suinioris. And after three years, the TQM program at Rush is steadily moving toward its goal of achieving "uniform quality across the whole system" she says. The entire Rush system is scheduled to be using the TQM process in some form by July 1995.

Every one counts. 3M's TQM process is built on the belief that every hospital staff member can have an impact on improving patient care. Therefore, Rush employees must be trained in the TQM philosophy. Currently, all senior managers and 8,000 employees have completed TQM training,. All Rush employees are scheduled to have completed training when its fiscal year ends june 31,1991.

Eighty departments have already completed initial training. and 32 departments have completed quality improvement plans. TQM philosophies have been linked to job description and job appraisals throughout the sytem.

Sinioris is the first to say that not everyone in the institution is committed to applying TQM. There are still employees and managers who have a "wait and see"attitude or regard TQM as the newest management fad. But for the most part. the response has been overwhelmingly positive. It was a surprise to me see how dedicated employees have been to making improvements in their work." She notes.

Return on investment. Rush commits $100,000 a year in direct operating expenses for the TQM program. That covers the salaries of two full-time. TQM staff members and expenses for training materials. promotional posters and mugs. and other motivational and educational tools. Another $60.000 to $100.000 was initially spen on customer research to determine areas in need of improvement. That research will be repeated periodically to measure improvements.

Rush is already seeing a return on its investment. The TQM process has been credited with such department improvements as:

* Decreasing the X-ray repeat rate in diagnostic radiology and reducing the department's absentee rate by 22.7 percent from 1987 to 1988.
* Reducing laboratory result turnaround time by an average og 25 percent, resulting in a 10,000 saving.
* Reducing the number of checks manually typed by the accounts payable department 25 percent.
* Improving patient transport by adding eight additional FTEs.

Beyond hospital care. Rush and 3M are working on applying the TQM process to Rush subsidiaries such as the Home pharmacy service. The university, and the managed care plans.

Home Pharmacy, Rush's for-profit mail -order pharmacy service that operates under Arc ventures. Inc., bgan using TQM concepts in pilot projects three years ago. The process is a good fit for the pharmacy service. Says Ed fischer. Ar ventures vice president.

That may be because the Home Pharmacy division has many of the same qualities of other small industries. It sells a service-home delivery of mainte-

nance mediciation combined with claims processing-to employee benefits purchasers. Home Pharmacy's 160 clients includes self insured companies, thirparty administrator, insurance companies, and managed care organizations.

The 40 home Pharmacy employees applied 3M's concepts to the day to-day problems that occur when filling 35,000 prescriptions per month.

For example, the employees suggested streamlining the nine separate forms used for customer service, order delays, and prescription returns into just three forms. The resulting reduction in paperwork saved one penny per each prescription filled.

Another projects pinpointed the most common reasons that kprescription orders were returned unfilled to the patients. Using a customer survey, Home pharmacy determined that prescriptions were returned most often because patiens were either ordering refills too early or ordering refills on prescriptions that had expired.

Before the survey, Home Pharmacy didn't know that many patients were unaware of the one-year limit on prescriptions. It then decided to include an editorial on prescription limits in most issues of the Home Pharmacy's semiannual newsletter.

TQM concepts apply readily to measuring improvements in error rates or response time in the mail-order pharmacy setting, says Fischer. Most of all the program has helped Home Pharmacy employees know where to concentrate their energy when making improvements. IN some cases, that has meant redesigning standard formats; in other cases, it has meant increasing patient education.

"Ultimately, the feedback in the TQM process can take virtually any operation ahead in its quest for customer satisfaction," says Fischer.

TQM in the University. Rush is one of the first universities to begin applying the TQM process, says John Trufant, Ed.D. vice president of academic resources and dean of Rush'a college of Health sciences and graduate schools. He believes that many of the basic principles of TQM are already present in good university management. "The tenets underlying TQM-empowerment of the staff,pushing decision making down to the lowest possible levels, and participatory management-are things that university setting are good at anyway,"he says.

Rush has not yet applied TQM to any academic programs, although a few health sciences departments are gearing up for it. However, Rush has

successfully applied TQM to academic support services, particularly the university library and biomedical communications department. Both of these divisions have applied classic TQM principles to deterkine how they could better meet their customer's expectation.

The University library is currently developing a system to ensure that its resources are available to those who make specific requests for them. In particular, the library noticed that many books put on hold were not available when borrowers came to pick them up. The library designed a now chart of the entire "hold" process and pinpointed exactly where the current system broke down.

For example, some books requested to be held were no designated as "holds" in the library computer system, and others to be held were accidentally reshelved and then checked out again before an existing hold request was fulfilled. Library personnel are now in the process of developing a system to ensure that hold requests are honoured.

Another result of TQM has been increased use of the university's biomedical communications department. As part of TQM, the department launched a self-promotion campaign. The campaign was so effective in increasing use of department service that the department had to add two full time employees.

TQM has been applied for a year in the academic support services areas. During this time. Trufant admits he has seen a few false starts. For example. a survey of library customers turned up little new or interesting information to use for quality improvement projects. In fact, the majority of respondents said the library was already doing a good job meeting their needs.

Although library staff were glad to discover that they had satisfied customers. "It did not mean we couldnot do things better or that there weren't ways of increasing our efficience."Trufant points out."That's really what we're working on".

The managed care frontier. The introduction of TQM priniciples to Rush Health Plans. Inc(RHPI) is just now getting under way. The plans hope to use the TQM process to help achieve their long-term goal of becoming the most well-known and respected managed health care plans in the Chicago area.

But the Plans don't expect to be able to supply the TQM process overnight, says Barb Wener. RHPI's quality improvement process coordinator. The Rush Health Plans umbrella includes three distinct product lines: a staff model HMO. an independent practice association (IPA) and a preferred provider organization(PPO).

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The diversity of each entity will make coordinating the TQM process an ongoing challenge. Each plan has a different customer group to please and thus different problems to address, wener says.

For example, improving patients'access to care will be the goal at the 16 HMO sites. For the PPO and IPA Plans, the focus will be on improving contractual arrangements with vendors and providers.

The success of the quality improvement efforts RHPI will rest on identifying customer needs. To do this, wener will rely heavily on the Plan's 800 employees to device solutions to identified problems.

That's the heart of the 3M/Rursh TQM process" We realize that we must focus on the customer's expectations when we plan our improvements." Notes Wener. "We're going to do what with employee participation because they know best.

HEWLETT-PACKARD COMPANY

Have you ever sat down with other people at your company to took for a better way to meet customer's quality needs, only to have been disappointed with the results? The reason for your disappointment may be that one important element was missing from the equation your customer themselves. Listerning to them is what provides real insight into meeting their quality requirements.

While Hewlett-Packard Company's Northwest Integrated Circuit Divion(Corvallis, OR Is in business to sell chips to other divisions inside Hewlett-Packard(HP), it also serves customers outside of H.P. The problem that it faced about five Years ago, however, was that the customers were interfering with them as they performed their work.

Fortunately,management saw the obvious need to address these problems."We wanted our people to become very familiar with our customers and realize that they were here to serve those customers,"says Casey Collet,, Ph.D., Total Quality Control manager."Our goal was to become to responsive to our customers that we would be the only suppliers with which they would want to do business.

A Four-step Process:

To meet that goal, the division, launched its total quality control effort in 1983. Collett says it involves four steps.

Step #1: On your own, identify what you feel your major business pro-

cess are.

Step#2: on your own, determine how you are being measured by your customers.

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Step#3: Go out and verify these two perceptions with your major customers.

Step#4: Develop a program to improve these process.

To execute these four steps, division management created a small group of TQC experts who currently report directly to the division manager and work closely with a steering of top man agers. TQC members have expertise in manufacturing, teaching,statistics, and group facilitation together. The divion quality and TQc departments attack customer satisfaction and internal process improvement issues, respectively.

The Divison has also created a three- point TQC model, which has expanded to a seven point model over the years.

HP's 10 step Planning Process:

The key to achieving TQC from the customer's point of view at HP is a 10-step business Planning pioneered by planning expert Scott Feamster. This process requires the following:

1. Purpose
2. Objectives
3. customers and distribution Channels
4. Competition
5. Necessary Products and services.
6. Plans for necessary products and service (research, manufacturing, financial and marketing plans)
7. Financial analysis
8. Potential Problem analysis
9. Poetential problem analysis
10. Next Year's tactical plan

The 10-step business process, then is a systematic way of:

1. Understanding the business you're proposing to be in:
2. Understanding your customer's needs:
3. Understanding the market and competitive environment you're entering and as a result of these understanding

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4. Making solid.well-thought-out plans tomeet your objectives.

when you have developed your strategy, you should have an objective. methodical business plan that looks at what customers need and what you are going to do about those needs," says collett."Then you can take this document back to the customer and verify its accuracy."

A crucial element of making the 10-step business planning process work is what John Doyle, HP executive vice president for systems Technology, call" imaginative understanding of user's needs"(IUUN). "IUUN is becoming an integral part of how HP does business," Collett reports, adding that the philosophy of IUUN is to hear what customers say their needs' (IUUN is becoming an integral part of how HP does business,"collett reports, adding that the philosophy of IUUN IS to hear what customers say their needs are, and apply the creativity and knowledge you have to create solutions for customers.

8.11 QUALITY FUNCTION DEVELOPMENT:

While IUUN is critical to the success of the business planning process. Quality Function Development (QFD) is criticial to the success of IUUN. QFD is the philosophy of designing your process in response to customer needs.

"Before QFD, we did not always realize the importance of understanding customer needs says collett. "As a result, we often invented products that we thought people such as ourselves would want, instead of asking out customers what they wanted."

Currently, the Division uses QFD in its R&D and marketing areas. "It helps us find out what our customers need so that we can build these needs into the next generation of our products".

QFD'S Planning Matrix

One of the most important tools in QFd is the Planning Matrix. Once you know what your customers requirements are, the next step is to translate these data into product development plans. The Planning Matrix Plots customer requirements on one axis and business processes and their measures or product features on the other axis. The idea is to be able to determine the fit between customer needs and product features. "The planning Matrix puts a lot more objectivity into the product development process," notes collett.

Here's How it Works.

Down the left side of the matrix are rows of user needs. Across the top of the matrix are columns of product features. With the matrix. you can see

where a reow intersects with a column and, in that cell, as yourself if there is a stron relationship, a week relationship, or no relationship between what the customer requires and what your company is doing.

If you find no relationship on a highly rated need as ranked by the customer, they you need to look at your product design plan and address the problem, since the customer considers it important. Conversely, if you are building in steps in the design process that have no bearing on customer needs, you may be able to eliminate them. For example, you may be doing test procedures on something that the customer doesno't care about.

R&D then creates another matrix of customer needs by process control characteristics) that will have to be met in order to give customers the features that they want. In short, the system translate raw customer data into focused activities for helping Marketing, R&D, Manufacturing, and Quality to make the desired product a reality.

Two More Tools for Success

HP uses two other tools to ensure that it is responding to the quality requirements of customers.

Customer Quality Engineers are electrical engineers who work with Marketing to gather customer dat. And with R&D and Manufacturing to make sure customer issues are addressed The task is not always easy. "Clients ask questions in their own terms."says Collet.. customer quality engineers thus need to translate these terms so that answers to their real, often unarticulated problems can be found. Then they need to translate the solutions developed by the Division back into language that the customers will be able to understand and utilize.

Process improvement Teams attack customer issues throughtout the Divison's team concept."A few of these teams interface so closely with customer divisions that they ask the customers to be on one of our teams,"says Collett."This certainly gives teams direct feedback from customers."

The teams solve customer problems and then return to customer locations to show them what they have accomplished. "The concept works well, because customers essentially drive the improvement process,"She adds.

Focus on the Future:

Things have been improving. "Our Quality is better, our planning processes are improveing and teams are busy with improvement projects,"says collett. "Sales are up, but we never take customer satisfaction for granted. On

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an annual bassis, we verify with our customers that our process and the way we are measuing ourselves reflect customer satisfaction. We refine the measures more and more over time to make sure that they accurately reflect what the customer wants.

TERMINOLOGY

Acceptable Quality Level(AQL): The mutually agreed(between producer and customer) and designated value of defective, percentage, that is, defects per hundred units, that the customer finds acceptable by the procedure of sampling employed in product acceptance.

Goal : A set of aims towards which the company efforts are directed or focused.

Non-conformance : Undesirable non-compliance with respect to a specific product/process quality characteristic, requirement of committed delivery time, schedule of product, part activity, instruction of any other stipulated requirement.

Objective : It is the assigned goal or the result to be achieved.

Rolling Plan : A plan for three to five years which is reviewed annually. Based on this or the actual results, the plan for the next three to five years is formulated.

Sub-Optimal : A condition or a combination or conditions that falls short of producing the best results in the company.

Target: A desired a specific performance level.

Total Quality Management(TQM) : An approach of improving and assuring quality in business. Managerial and technological process for effectively achieving total customer satisfaction.

TQM Policy : A course of plan of administrative action/provisions to implement TQM

Zero-defect : Absence of any non-conformance of product or process with respect to the the requirement and time of checking (inspection/test) for conformance,(Requirements may change over time by way of revision of accepted standards/limits. IN such a case, the zero defect should be interpreted according to the revised standards/limits.)

8.12 ANSWERS TO CHECK YOUR PROGRESS

1. Business process re-engineering is a business management strategy, originally pioneered in the early 1990s, focusing on the analysis and design of workflows and processes within an organization. BPR aimed to help organizations fundamentally rethink how they do their work in order to dramatically improve customer service, cut operational costs, and become world-class competitors
2. the cost of quality is the difference between the actual cost of making and selling products and services and the cost if there were no failures during manufacture or use and no possibility of failure.
3. Prevention, Appraisal, Internal failure, External failure.
4. Quality function deployment - Quality function deployment (QFD) is a "method to transform user demands into design quality, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and component parts, and ultimately to specific elements of the manufacturing process.
5. Deming contributed for the philosophy and procedures for total quality management. Deming Quality prize is being awarded for the quality management practices.

8.13 REVIEW QUESTIONS

1. What are the principles of Re-Engineering
2. Explain the categories of Quality cost.
3. Discuss the role of Zero defect management system in TQM
4. Write a note on QFDS Planning Matrix

UNIT IX & X

ISO 9000 : UNIVERSAL STANDARDS OF QUALITY

UNIT STRUCTURE

ISO AROUND THE WORLD

BENEFITS OF ISO 9000 CERTIFICATION

IMPLEMENTING THE SYSTEM:

WORLD CLASS PRODUCTIVITY AT STANDARD AERO

BENCHMARKING: TALES FROM THE FRONT

EMPLOYEE INVOLVEMENT MAKES TQM WORK

UNIT OBJECTIVES

1. To learn the ISO 9000. Around the world Benefits of ISO 9000
2. To understand the Implementing System
3. To learn the Benchmarking. Employee Involvement makes TQM

Check your Progress

1. What do you mean by ISO?
2. What is zero defect programme?

"Simply put. ISO 9000 has come to be the price of admission for doing business in Europe."says Robert Caine, Prsident of the American Society for Quality Contraol (ASQC),"Ask any business person who has given up trying to gain entry into the.European market what stopped him, and he's likely to answer in code: ISO 9000,"concules kymberly Hockman of Du Pont's Quality Management and Technology Centrer. These are among the many experts who are urging U.S. firms to take the ISO Series standards seriously.

Even if a firm does not do business in Eruope or does not plan to do so. It should not ignore this accelerating movement to internaltion standards. As will be discussed , the movement is expanding into other areas of the world and into many areas of the U.S. Public and private sectors as well.

ISO 9000 is a set of five worldwide standards that establish requirements for the management of quality. Unlike product standards, these standards are for quality management systems. They are being used by the twelve-nation European Ecnomic Communcity to provide a universal frame work for quality assurance-primarily through a system of internal and external audits. The prupose is to ensure that a certified company has a quality system in

place that will enalble it to meet its published quality standards. The ISO standards are generic in that they apply to all functions and all industries, from banking to chemical manufacturing. They have been described as the "one size fits all"standarda.

ISO AROUND THE WORLD:

The eruopean Communicty (EC) consists of twelve member nations: Belgiou, denmark, finance, germany,Ireland, italy, Luxembourg, tha Netherlands, Portual, spain and the united kingdom. The goal of the EC is to create a single internal market, free of all barriers to trade. For products and services to be traded freely, there must be assurance that those product meet certain standards, whether they are produced in one of the EC nations or in a non-EC nation. Such as the United States. The EC is using the standards to provide a universal framework for quality assurance and to ensure the quality assurance and to ensure that quality of goods and services across borders.

The international organization for standardization (IsO) is the specialized internation agency for standardization and at present comprises the national standards bodies of 91 countries. The American National Standards Institue (ANSI) is the member body representing the United states. ISO is made up of approximately 180 technical committetees. Each tecnnical committee is responsible for one of many areas of specification, ranging from asbestos to zinc. The purpose of ISO is to promote the development of standardization and related world activities in order to facilities the international exchange of goods and servicesa dn to develop cooperation in internations exchange of goods and services and to develop coopeation in intellectual, scientific, technologica, and economic activities. The results of ISO technical work are published as international standards and the ISO 9000 series is a result of this process.

In 1987 (the same year the ISO 9000 series was published), the United States adoped the ISO 9000 Series verbatim as the ANSI/ASQC Q-90 series. Thus, the use of either of these series is equivalent to the use of the other. The ISO standars are being adoped by a varying number of companies in over 50 countries around the world that have endorsed them. Many People belive that within five year registration will be necessary to stay in business.

By 1992 more that 20,ooo than 20,000 facilities in Britain had adoped the standards and became certified. Over 20,000 companies from other EC

countries have registered, compared to about 620 in the U.S. the Japanese not have adopted the standards, but alos have mounted a major national effort to get their companies registered.

The EC adopted ISO 9000 in 1989 to integrate the various technical norms and specifications of its member states. By 1991, ISO compliance became part of hundreds of product safety laws all over Eruope, regulating everything from medical devices to telecommuncations gear. Such products accounted for only about 15 percent of EC trade at that time, but the list of products is growing. Entire industries are encourage the adopting of the standards.

One example of the impact is reflected in the requirements of siemens, the huge German electronics firm. The company requires ISO COMPLIANCE IN 50 percent of its contracts and a pressing all other suppliers to conform. A major justification for this it eliminates the need to test parts, which saves time and money and established common requirements for all markets.

Even for companies whose products are unregulated. ISO standards are becoming a defacto market requirement for doing business with other EC companies. If two suppliers are competing for a contract or an order, the one that has registered its quality systems under ISO 9000 has a clear edge.

Check your Progress

3. What are the benefits of ISO certification?
4. Enumerate the steps in ISO certification?

The impact of these standards is reflected by the widespread distribution of the ISO 9000 Series, which has become the best-seller in the history of the ISO, under whose auspices they were developed. ISO 9000 EVEN outsold the universal and long-standing international weights and measurement standards. However, it is worth repeating that ISO 9000 is not standards for products but standards for operation of quality management system.

BENEFITS OF ISO 9000 CERTIFICATION:

1. The benefits to the organization gained by improving quality in products and services were outlined in Chapter1. To repeat:
   1. Greater customer loyalty
   2. Improvements in market share
   3. Higher stock prices.
   4. Reduced service calls
   5. Higher prices
   6. Greater productivity and cost reduction

These same benefits would be achieved by ISO 9000 certification to the extent that actions leading to certification result in a quality management system. Moreover, certification provides the additional benefits of acceptance by EC customers and others whose criteria of acceptance in clued ISO 9000 certification.

Experience tends to confirm that companies do achieve these benefits. Consider the following examples:

* A Britiish government survey revealed that 89 percent of ISO 9000 registered companies reported greater operational efficiency. 48 percent reported increased profitability. 76 percent reported improvements in marketing, and 26 percent reported increased export sales.
* The British standards institution, a leading British registere,estimeates that registered firms reduce operating costs by 10 percent on average.
* Du pont attributes the following results to the adoption of ISO Standards in their plants:
* On time delivery at one palnt increased to 90 percent from 70 percent.
* Cycle time at one plant went form 72 percent to 92 percent.
* Test procedures were reduced from 3000 to 1100
* A number of U.S firms have repreted benefits ranging from increased sales to improved communications.

THE COST OF CERTIFICATION:

A frequently asked question is "How much does certification cost?" This is legitimate concern, although the question may be accompanied by another one: "What is the Pay of?"

There is no set answer to how much it costs and how long it itakes. Each company is different. The answer depends on such factors as company size. Product line, how far along the company's existing systems are on the quality continuum, whether consultants are use, and the implementation strategy adopted, it can cost a small company 2000 to 25000 in consulting fees for advice on developing a quality systems. Employees time in creating the system is must be created from the ground up, it can take a year and cost 100000 or more.

IMPLEMENTING THE SYSTEM:

Although the series provides guidance on the required attributes of the quality system.the standards do not spell out the means of implementation. Once a decision is made to adopt the standards and seek certification. The following major steps will facilitate successful change.

* Recognize the need for change and get the commitment of top management
* Incorporate quality in the strategic plan as the linchpin of differentiation.
* Formulate and adopt a holistic quality policy statement adapted to ISO requirement Get support and commitment form all managers.
* Determine the scope of the business to certified. Will it be a particular process, related facilites, a geographical site, or the whole company?
* Determining the status of the current quality system through ah internal audit. Define the gap between where you are and what it will take to close the gap.
* Estimate the cost in time and money and implement the plan by organizing the necessary action steps.

WORLD CLASS PRODUCTIVITY AT STANDARD AERO

Standard Aero, located in Winnipeg, Cannada, is in the business of repairing and overhaulting aircraft engines. The company has become one of the largest supplers in the world for turbine engine and accessory overhaul and repair. The company summarizes its success in two words: "World's Best". It was not always this productive. Amonth the objectives set by President Bobhamberg is to cut the time ti takes to overhauls an engine from two months to fifteen days.

In 1989 the company was acquired by Hawker Siddley, a U.K. conglomerate. In the same month as the acquisition. Hamaberg attended a management meeting in the U.K. Dr. Alan K. Watkins, the recently appointed managing director and chief executive of Hawker siddeley, previously of Lucas industries.led a two-day series of presentations focused on TQM and in particular how lucas industries had significantly improved productivity and financial results.

Lucas industries had established Lucas Enigneering and systems Ltd. (LE%S) to provide best -practice skills to the process of managing change. LE&S applies modern systems engineering methodologies to the redesign of the business. Its manufacturing systems, organization, and key processes. LE&S provides these services to Lucas businesses throughtout the world and also sells similar support services to other businesses. Primarily business partners. Watkins messages was essentially: fix the business, not the product.

"When I cam back I was convinced we had to re-evaluate the rational ways of doing things and look at doing things in ways in which we never had before, "said Hamaberg. After dwelling on the subject a while, he called how own management meeting and threw down the gauntlet. His message was simple. "I want an order magnitude improvement in all aspects of our business. Five to ten percent will not do! 75% is the target."He underscored his messages by inviting his management team either to sign up or discuss their alternatinative carrer plans with him. Intially, management was offended. Gradually, reflecting Hamaberg's logic, they came on side.

In on time, projects were in flight. The first was a reduction program, in three months of examining reports and practices, the company eliminated 20% of its annual paper consumption. Local suppliers were soon visiting the buyers to find out what was going on. The next target was the aoounting organization. Hamaberg spent four hours talking with the accountants about TQM and how they might change to provide better services to customers. The out come of this meeting was both creating and a challenge to the way in which most accounting organizations work.

The six most senior finance managers were reassigned to operations, reporting directly to the business unit managers. Leah Muller, previously controller, used to have a staff of 29 people. But now has none. She describes how she initially maintained a safety harness by retaining some or her acoounting responsibilities. After a few months, Leah gave up the old activites voluntarily. "I found that I was enjoying myself and making a much greater contribution to the business by being on the front line."Throught moving the accounting staff, relations with operating people also improved significantly.

Within a short period of time, accounting record accuracy improved substantially. The business unit accountants were responsible for the accuracy of transaction of all kinds associated with their operation. The emphasis among the now dispersed accounting staff moved from keeping records of other peoples

activities, attempting to capture errors through reconcillations, ana clearing accounts and audits, to producing correct entires and documentation at source, hence doing it right the first time. This attitude shift was entirely consistent with the principles of TQM. Specifically, build quality in, donot inspect it in. Total accounting staff have been reduced from 40 to 22.

Other organizations quickly, followed suit. Engineers were physically moved, and the central sales and marketing organizations was completely dismantled and re-assigned to the business unit manager.

Business Redesigned

In December, Hawker Siddeley asked its subsidiaries for competitive proposals to undertake TQM programs. Those selected would receive training and consulting support from Lucas paid for by Hawker Siddeley. Natually, this was too good an opportunity, to be missed. Standard Aero went the extra mile in preparing its proposal. And succeeded. So began what Hamaberg describes as the most exciting part of the redesigning of the entire firm.

The project, which kicked off at the beginning of 1990. was to redesign the complet business. The unit chosen was standard Aero's biggest: the T 56;Allision Engine Overhaul. Where in many companies. TQM meant doing what they were already doing better, the Lucas method is to make redical change. T56-Allison Engine Overhaul was to reduce total elapsed time by 75% from the industry norm of 60 days to 15 days. Since the objectives was deadly serious. The team as signed full time of nine to ten months was the same group who would stay with the business and run it once the project phase was complet. The team consisted of

* A director level finance manager
* A senior engnineer
* The director of MIS(an engineer who had previously been a business unit manager)
* The business unit director
* A mechanic from production
* An inspector from production

The team was headed up ful time by a Lucas consultant who acted as a facilitator. Two training sessions were held. The first, held in the U.K. in may 1990 was attended by tow candiates

Ans, The second, a five - day sessions described as foundation course,

was held in winner and delivered by three Lucas engineers. Following the foundation course, the project beganearnest.The team worked through five major steps;

1. Identify the business;
   * What is it?
   * Who are the players?
   * What is the market?
   * Analyze the competition.
2. Develop a questionnaire and interview the customers to identify their needs and concerns and establish a new level of rapport.
3. Evaluate customer complaints and requirements and compare them to competitor information. Develop a strengths and weakness analysis.
4. Determine which customers and business they wanted - Lucas calls this scientific marketing.

Toward Continuous Improvement

After nine months, the first manufacturing cell has been implemented with better then target results. What used to take 30 days now requires only three days. One job which required parts to be moved to another building and three days' elapsed time now stays in the same cell. The whole job takes only a few minutes. The key was to eliminate flow discontinuities and to abbreviate time and distance travelled. Taking advantage of technology to replace old methods has been a critical concern. There are six other cells to be implemented but, together, they should take only a six months to design and implement. Walls have already been pulled down and areas prepared.

Check your Progress

5. What is continuous improvement?

For T56 - Allison Engine Overhaul, the challenge has passed to the marketing people to develop the business, new products and, working with suppliers, the opportunities. Sales people are now required to act more as a technical interface between the product and the customer. Project team members will soon leave their paper strewn meeting room, decorted with project charts of all kinds, to move to offices co - located with production. There they will run their newly designed and much improved business - a business they have personally examined in excruciating detail and for which they now feel a considerable sense of ownership.

For the company, seven more projects will be undertaken so that every aspect of the entire business will have been evaluated.Meanwhile, raching 15

days turnaround is only the first hurdle for the T56 group. With continuous improvement, 15 days will be old news before to be long.Company results have already registered the benefit of productivity and TQM steps over the past few years. Earnings were up 45% in the last year on sales increases for the same period of 4.5% Cash flow exceeded profits by 50%

Bob Hama berg clearly believes it is the team effort of a focused group which has delivered the results to date. He described the many communications programs standard Aero has in place. Also, how the company spends up to 1.75% of revenues on traning.No doubt leadership and application of disciplined techniques have also played critical roles.

BENCHMARKING: TALES FROM THE FRONT

Oregon state university

Oregon state university at Corvallis pioneered benchmarking in the academic world. The university picked a half dozen peer institutions - land- grant colleges such as Kansas state.cornell.and Washington state - and determined which one with in that particular universe was best in class by a host of measures. from financial aid and admissions it the scheduling of rooms and cost per athlete.OSU focused n clearly measurable processes. deliberately avoiding such conversial.hard to measure areas as effectiveness of teaching and reaserch.and used the data to screen for those processes that needed improvement at Corvallis.

"We then turn those process over to TQM teams." says OSU's former vice president for administration.Dr.L.Edwin Coated.": They do what is necessary. including benchmarking, to work out the problem. It has saved us significant amounts of money."

For instance the school's workers'compansation premium had suppressed 2 million per near. A TQM teems analyzed the problem. identified the Ares in which the greatest number of causes were generated (physical plant operations and agriculture) and adopted a few measures what were standard elsewhere. An early back - to - back work program encouraged rapid rehabilitation: sum dripped by half for a savings so s 1 million.

OSU's success soon becomes the talk of the National Association of college and university Business officers (NACUNO).which launched nationwide efforts of its own. In 1992 effort is wearing an estimated 60 to 100 institutions: the 1993 effort will expand to include more than 200.

Not only is NACUBO increasing the number of institutions it covers but it is edging in searching and research, and controlling data on such measurements as the ratio of faculty hours said to student credits awarded.NACUBO's goal is the creation of a database that its members on use,as OSU used its am all sample, to assess their efforts.

St.Joseph's Medical Center

In January 1992,St.Joseph's Medical center in Stockton,California,Working with the American productivity & Quality centre's International Benchmarking Clearinghouse IBC) and 28 other hospitals in the Health care Forum's Quality Improvement networks. set out to bench mark its admissions process. The networks had picked admissions because it is complex and important to customers,and because it has lot in common with admission,registeration,and other information -gathering, people - processing procedures in many other industries.St.Joseph's team de ceded to do the benchmarking in two pharses;During phase1.it would compare itself with the best in healthcare: in pharse2,it would look outside the industry for ideas.

The team made some revealing discoveries during the first pharse.St.Joseph's patients, for instance, had to sign an average of 12 forms to be admitted. Some of the best hospitals managed to keep that number to two: a few kept their average below even that. St.Joseph's patients had six to eight interactions with the staff (responding a problem study term called 'everyone asking the patient the same questions");the best practices needed only three interactions sometimes only one.

Some new practices at St.Joseph's that have come out of this first bench - marking phase include:

* Verifying patients' insurance before the date of admission.
* Training the admitting and finance staff to work out payment plans together
* Cutting the number of inspections given a new chart from four,five,or more per day to one or two
* Naming a quality team to work on reducing number of forms and questions.

The business and admitting officers are considering the following practices:

Creating 24 hour financial hotline or even offering business services 24

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hours a day Linking surgery scheduling and pre - admission scheduling by computer Gathering insurance information by linking doctors officers with both the admitting and the billing offices of St.Joseph's.

The team hopes to implement improvements throughout all of St.Joseph's eight businesses next.

In September 1992, the health care Forum released the results of phase 1 of the Best practices in inpatient Hospital Admitting study. In October The Healthcare Forum/IBM group men to began phase 2: looking outside healthcare and comparing its practices to those of Americans ,Airlines, Marriott Hotels,Riz - Carlton Hotels, Avis Rent - a - car, Prudential insurance and other companies. Among some early ideas: Marriott preregisters many customers, escorting them from the curb directly to the " direct - admit" process is possible. The complete details of phase 2 were released in December rooms, and few best practice hospitals have already found that the

Motorola

Motorola was an early pioneer in benchmarking. Among its other successes, it managed to slash the time taken to close the company's books at year - end from 14 to two days.

In the early 1980s, the company set an ambitious goal; it would improve a set of basic quality parameters tenfold in five years. There were congratulations all around, handshakes, morit badges for all. Then Motorola looked outside. It sent teams to visit the plants of its Japanese competitors to their chain, the terms found that Motorola would have to improve its tenfold - improvement level of quality measures another two to three times just to match the competition.

Kenneth J.Obrzut, director of group sector strategic programs. In Motorola's MIS depart ment.offers the moral of the story."Benchmarking helps determine what your accomplishments really are, and give you a chance to match or exceed the best in the business."

For one factory inFlorida, Motorola has since borrowed an order - entry process from walMart, adopted Benetton's idea of asking its stores to relay customer preferences on store items directly to headquarters through computer linkup, and even scavenged techniques from Domino's Pizza. Ten years after Motorola began benchmaking; the company routinely fields benchmarking requests from those same Japanese companies it toured the first time around.

Columbus - Cabrini Medical Center

A number of hospitals have used the ME CON - PEER database and analysis software to look to their operations and compare them with similar operations nationwide. The way have used the information vary, from classic benchmarking to informed analysis to simply putting muscle into a budget squeeze.

For instance, Chicago;s Columbus Cabrini Medical center first worked in - house companying each departments costs, caste load, and FTFs to the previous five years. unless the department could give a reason why the old numbers no longer fit(in one case, the OR's cases has shifted rather dramatically to more labor - intensive operations),the budge makers used the most efficient of the previous five years as the basis for the new year's budget. This practice was implemented about five years ago. Every year since, each departments budget has either remained at that same level or at the most recent year's level, whichever is best (again, unless specific reasons for the exception could be documented).

In a second pharse, the administration used MECON - PEER to compare each department with smellier departments in other central - city general acute hospital cross the country. The rule for the new budget year was: no department, no matter its historical numbers, could have a burn get that came in above the 50th percentile inFTE s per unit of services unless it could document difference that would make a difference. Everyone had to be at least average in productivity. It was not classic benchmarking, and it "was not real popular", as one official put it, but the provable comparable data helped the administration keep costs in line.

EMPLOYEE INVOLVEMENT MAKES TQM WORK

Although many rough many organizations have entered the philosophy of IQM,not all have been successful in achieving their goals. A study conducted by New York City based Ernst & Young. in conjunction with the Milwaukee - based American Quality Foundation: found that many companies are floundering in their attempts to implement TQM practices. A key including from this study is that many TQM programs fail, and others don't reach their potential because employees aren't involved. Without employee involvement, even the best quality program is bound to fall.

Associated Company Inc., a Wichita, Kanasas - based supplier of machine parts to aviation companies, knows the importance of employee involvement first - hand. In November 1987, the company implemented work smarter, a quality program aimed at reducing the company's expensive quality costs

caused by high scrap and rework rates and high external failure costs (failure that customers experience).

The first step that Associated took toward quality improvement involved setting the product - failure rate at 0.5% Top management chose this rate over a Zero - defect rate for two reasons.

1. The perfect rate would be unattainable and probably would be demonization.
2. The cost of achieving Zero defects might be grater that the benefits.

In addition to making the quality goal attainable. Associated crafted a plan that would be understandable and meaningful to all of its employees. The plan, which followed the teachings of quality gurus W.Edwards Deming and J.M.Juran, encouraged employees to be innovative and to take risks. Most importantly employees know that they had the opportunity to fail.

Group meetings high Associated communicate TQM to employees. To facilitate implementation and more - specific goal setting, the company decided its approximately 100 employees into eight groups. In the initial implementation, the quality manager met with each of the right groups. The quality manager described the magnitude met with each of the eight groups. The quality manager scribes the magnitude of the quality program, indicated the improvements that were necessary and achievable and explained the actions required. He tried to sell the program to solve the employees and their first - level managers.

To focus attention on the waste in manufacturing, the quality manager started placing orange tags on defective parts and broken equipment. One such message stated, "This casting costs $1,378. Can you afford to throw it away?" Another orange ticket read. "This machine costs $6,000 to repair. Can you afford to break it?' the orange tickets helped make the cost of quality meaningful to each employee.

The quality manager then started another cycle of meetings. Now workers paid much more attention to the cost of quality. Small projects that had high probabilities for success were selected and implemented successfully. Goals were set, and as the groups meet these goals, they were rewarded. ACI stressed group rewards to encourage teamwork. Some of the rewards included dinners at local restaurants, movie tickets and $50 savings bonds.

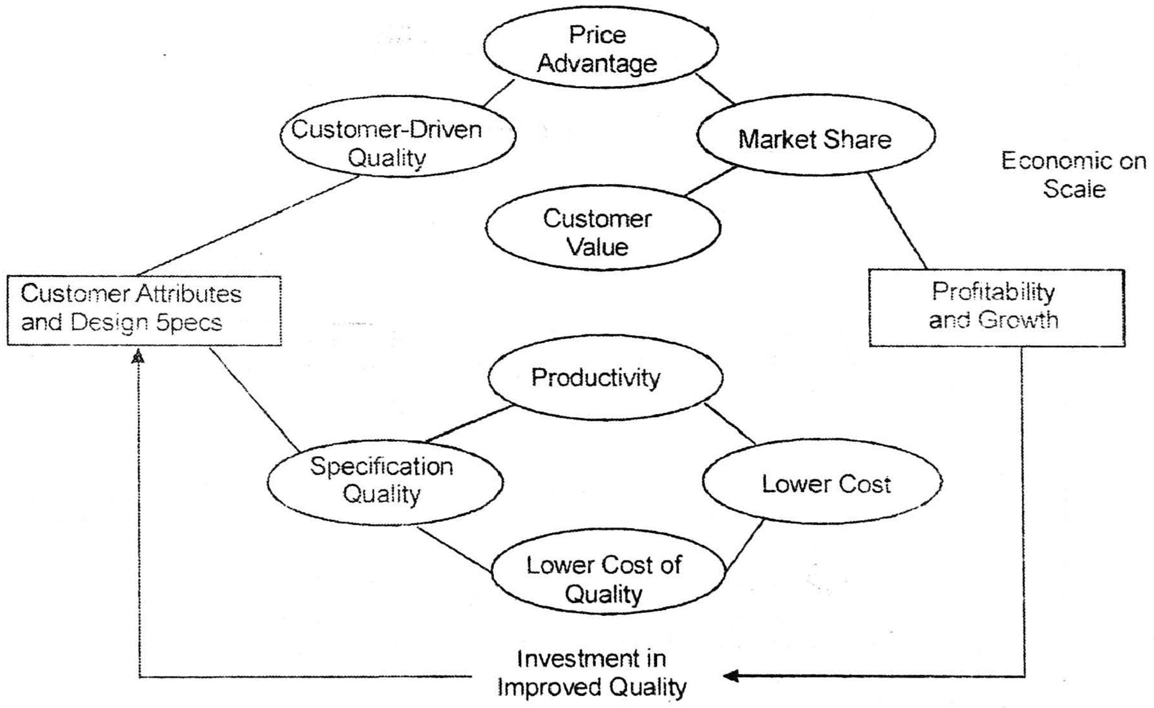
With the iteration of meetings and the successful completion of several small projects, the momentum builtquickly. Top management continued to expand the rewards program to include a wider variety of rewards for goals that employees attained. As a result, employees gradually accepted more authority

and responsibility for quality, and b[illegible]e more involved in all aspects of the business.

TQM improves scrap and rework rates and decreases turnover. As a result of work smarter Associated's scrap and rework rates declined quickly and bottomed out at a 0.25% rate. In addition, the company's annual turnover decreased from a high of 200% to 25% after the introduction of the program. A more stable work force that was involved in decision making and quality improvements, along with simple but powerful HR management practices, produced major gains for the company. These practices allowed the company to:

* Redirect its employees to become more quality-conscious.
* Set goals that were specific and challenging, yet attainable which led to increases motivation
* Link rewards to accomplished goals, which reinforced desired behaviors and made it more likely that employees would sustain their efforts.

In addition. continuous feedback about the groups' progress in relation to their goals made it possible for mid-course corrections and ensured that groups stayed on course toward long-term goals. Finally, by encouraging employee involvement through suggestions and specific work changes. Associated treated its people as human resources to be valued instead of more labor costs to be minimized.



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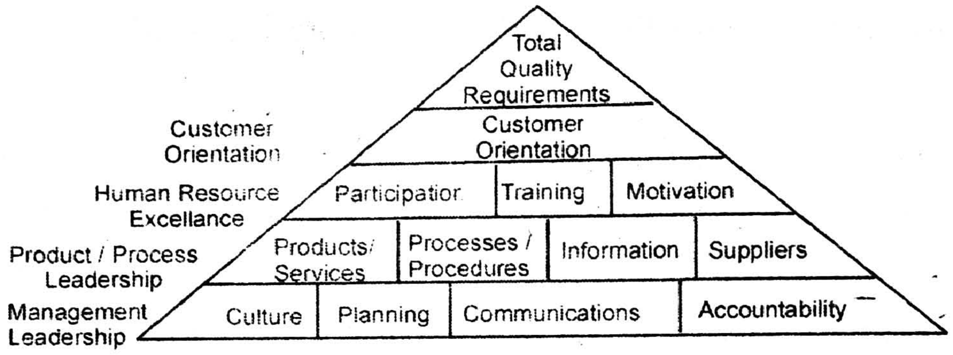
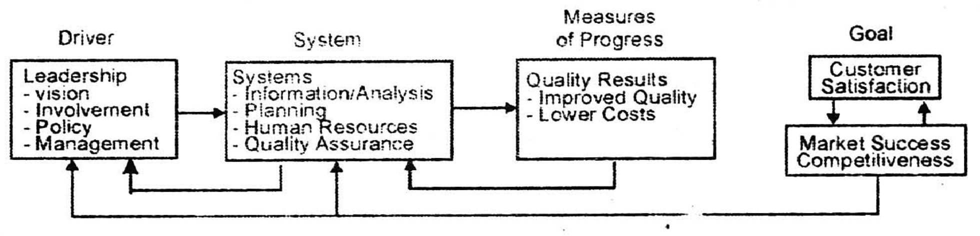
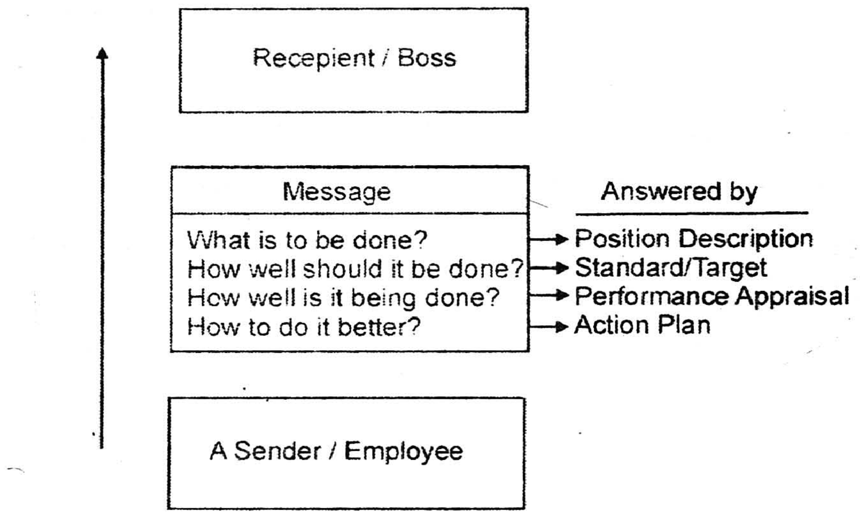


The Westinghouse Total Quality Model

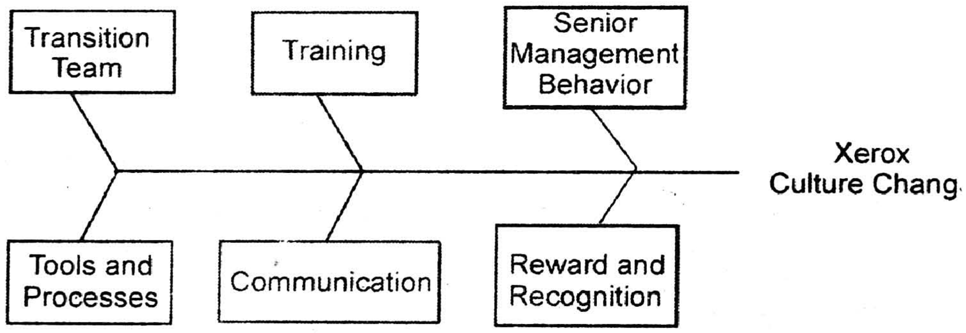


Framework of IBM'S Market Driven Quality Program

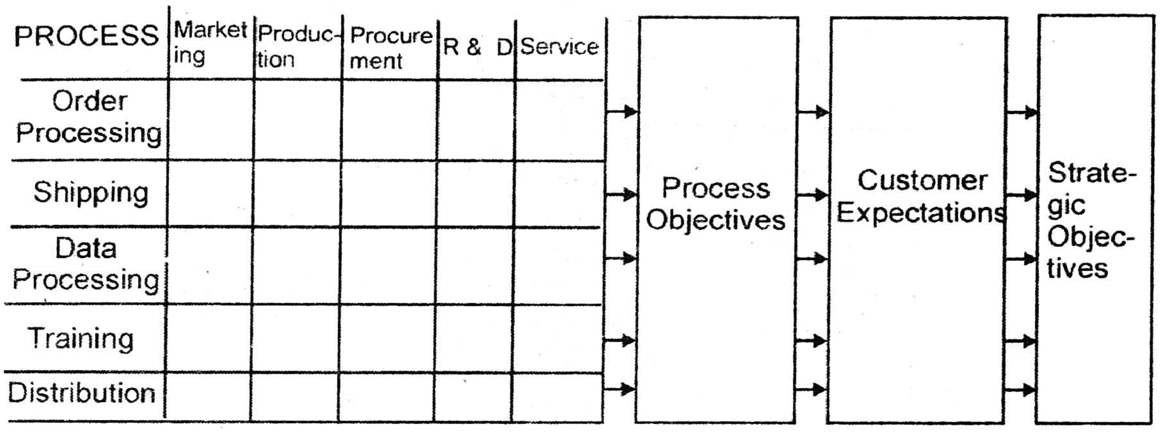


Effective Communication

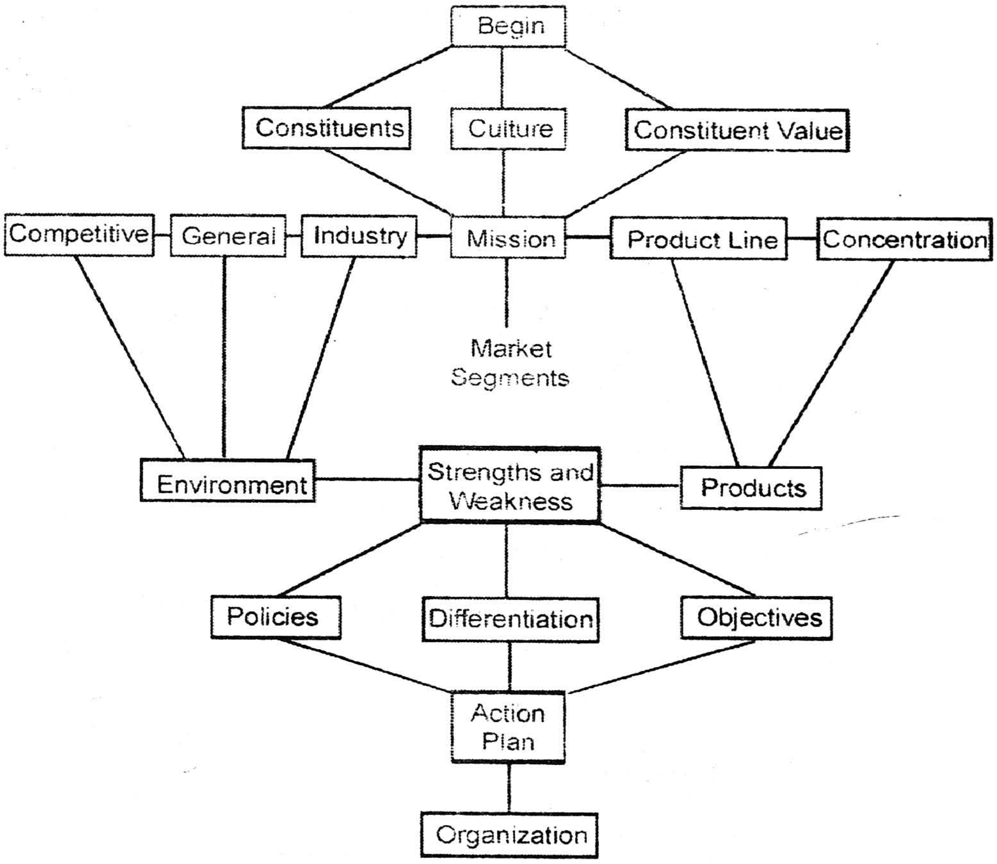
Total Quality Transition



Transition to a Quality at M/S Xerox



FUNCTIONAL OBJECTIVES



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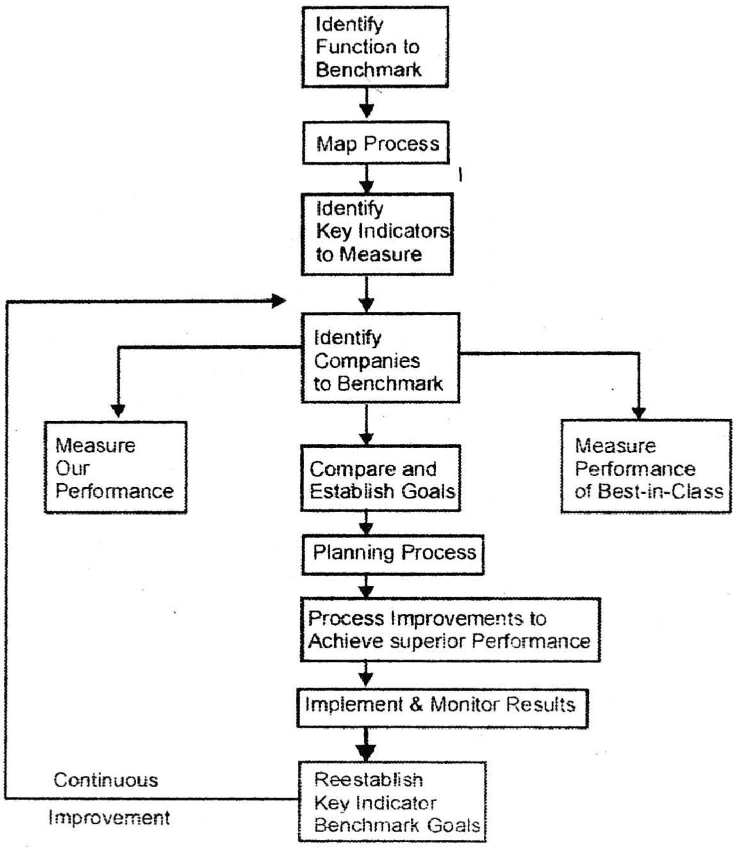
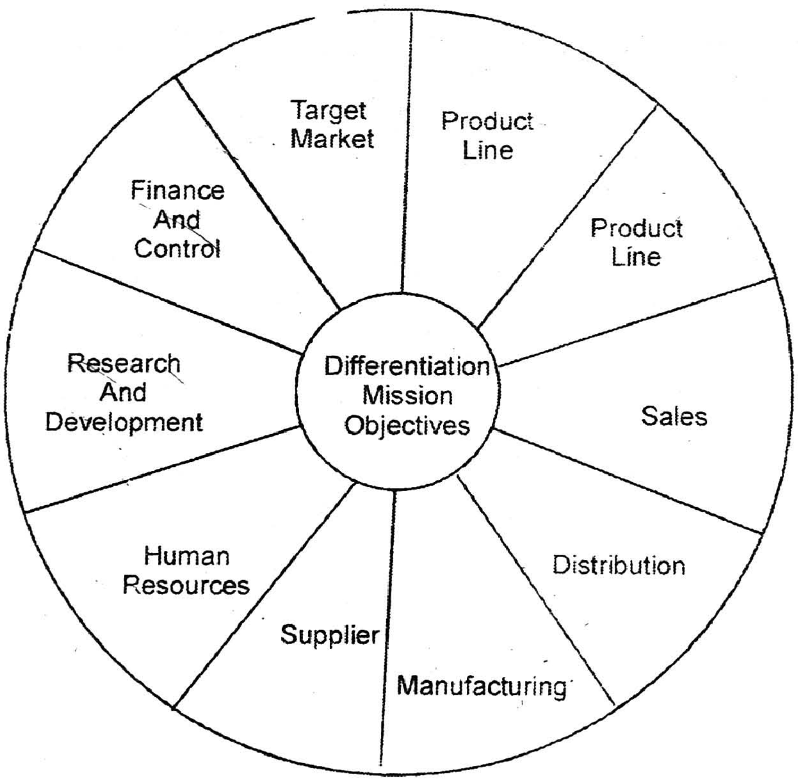


Benchmark Process at M/s. Varifilm



Policy Wheel

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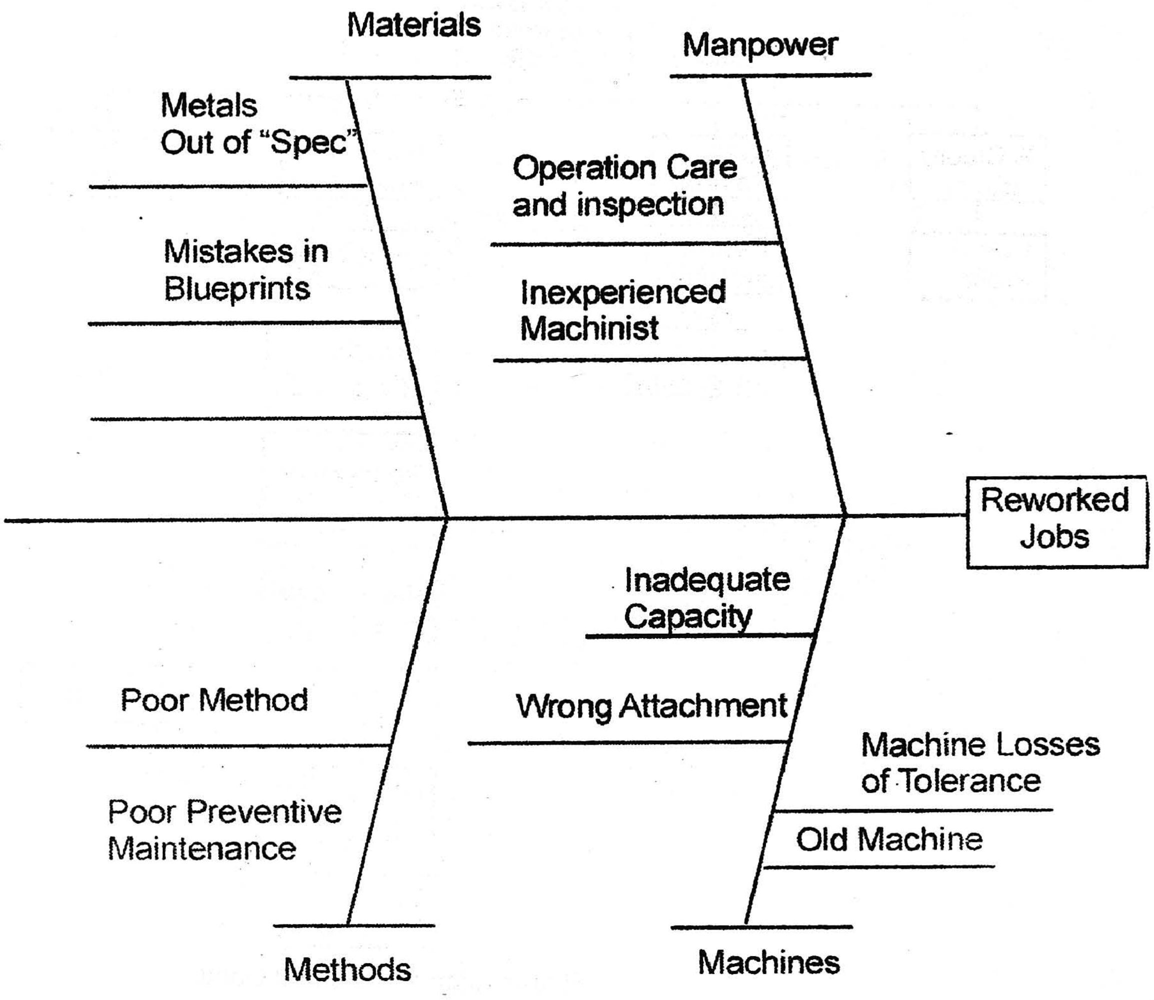
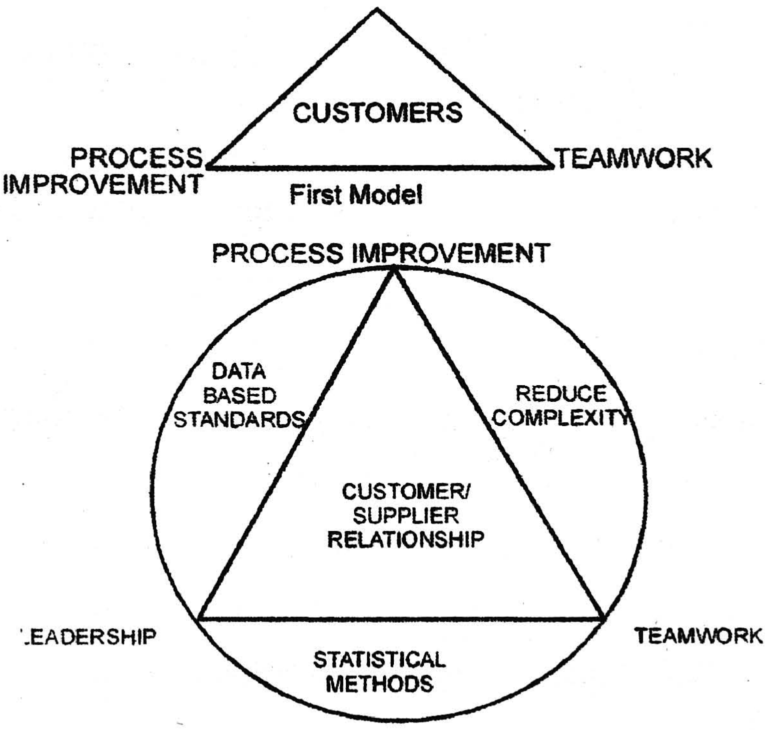


Cause-and-effect-Diagram



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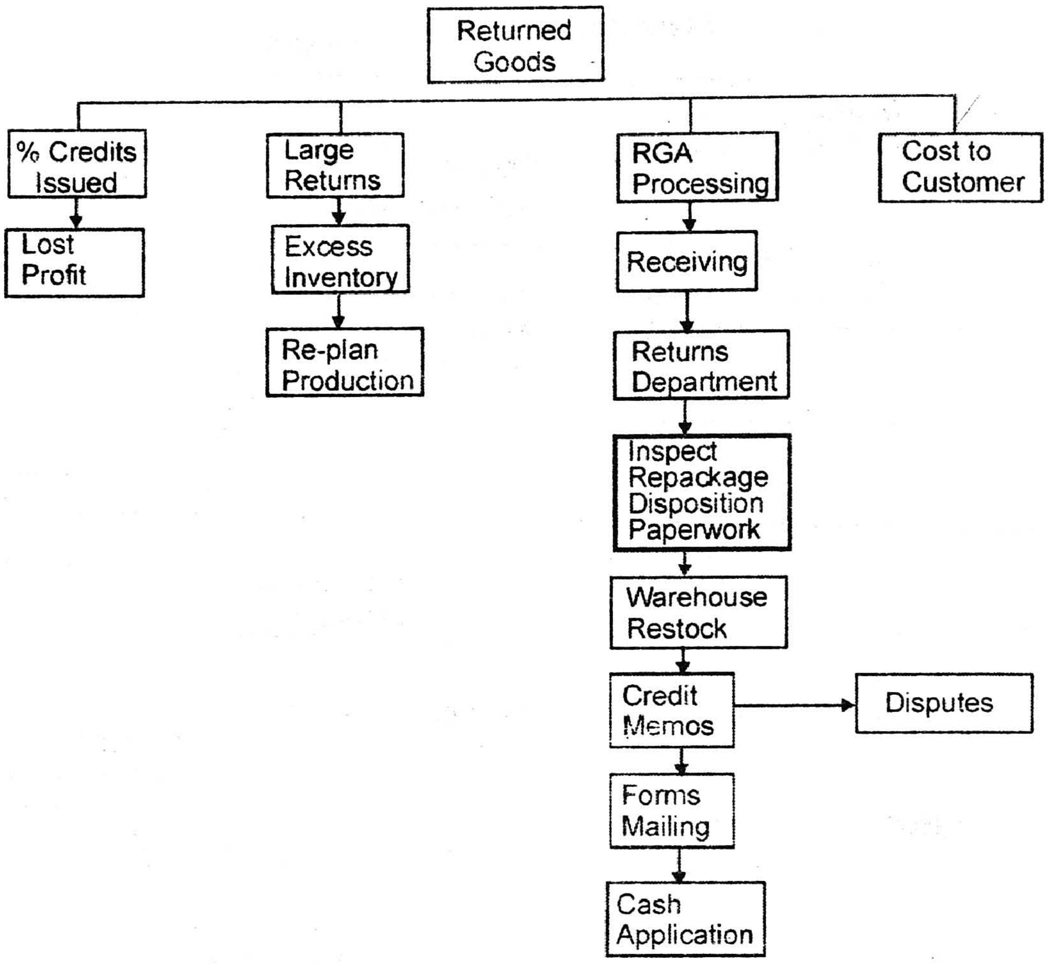

Ripple Effort of Returned Goods

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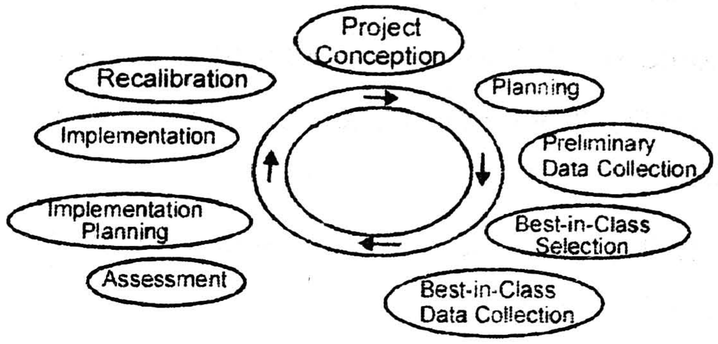
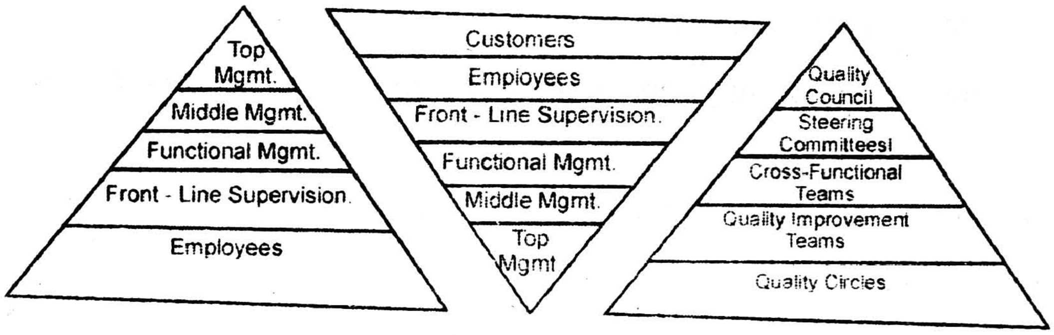
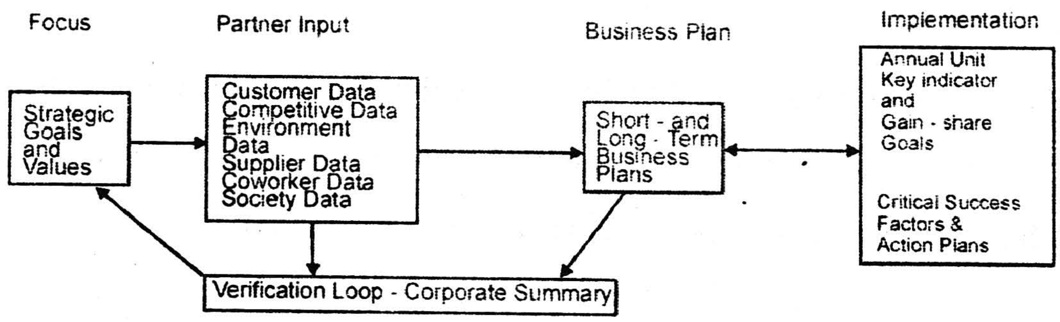


AT & T Benchmarking Process



Transition from Traditional to TQM organ



1. TYPICAL QUESITONS ON TQM

1. The focus of quality is not confined merely to product Explain.'
2. What is the ultimate goal of TQM
3. Quality is an inevitable phenomenon in this competitive world. Explain
4. It is important to communication the TQM policy to everyone in the organization why?
5. What are the steps to be taken by the top management to adopt TQM concepts?
6. Prepare a basic quesionnarie about any organizations for implementing TQM

7. Explain non conformance.
8. List out widely used approaches in TQM concepts.
9. Technology should be upgraded from time to time discuss
10. Commitement to TQM has became an essential attribute of good management Discuss.
11. Commitement to TQM has became an essential attribute of good management Discuss.
12. List out the supportive actions to promote the positive role of quality circles.
13. The customer feedback is a continuous process explain
14. BUidling up good suppliers is prized assests of the company discuss
15. List out the specific items that can be included in the process of improving the suppliers performance.
16. Explain Gant chart.
17. Explain quality circles.
18. Explain quality function deployement
19. What is quality audit.
20. Explain ishikawa diagram with examples
21. What is Parito Diagram?
22. List out various individual techniques available for improvement projects.
23. List out various individual techniques available for improvement projects.
24. What are theuses of Ganntt charts and Arrow diagrams.
25. What are the uses of Network methods?
26. What are the uses of Network methods?
27. What is policy deployment?
28. Explain quality Function Deployment.
29. Explain quality audit
30. Design review should be in tune with customer requirements explain
31. What is FMEA?
32. Explain SWOT Analysis with examples.
33. Explain Quality Costs with respect to rejects, rework, off-grade etc.
34. What are the uses of check sheets and graphs?

35. What are the uses of control charts?
36. What is CUSUM chart?
37. What are the applications of Control charts?
38. What are the benefits of Control charts?
39. What is process capability?
40. What is Scatter diagram?
41. What are the uses of Statistically Engineered Experiments?
42. What is Orthogonal Array?
43. What is 'Zero-defect'?
44. Delivery of right products and services on the right time is critical for customer satisfaction. Discuss.
45. How Quality losses can be minimized or eliminated/
46. What is PEEF Cycle?
47. Explain PDCA Approach?
48. What are the applications of Statistical concepts?
49. List out the techniques developed by Prof. Taguchi.
50. Shrinking cycle time is essential for cost reduction. Discuss.
51. What are the barriers to smooth manufacturing and delivery system?
52. Targets are based on objectives. Discuss.
53. Education and training is a continuous process. Explain.
54. Upgrading TQM is a continuous process. Discuss.
55. What are the points to be considered in designing a training package on TQM?
56. Prepare a training Questionnaire on Customer Service.
57. Prepare a Training Questionnaire with respect to product improvements
58. What are the points to be considered in developing a manual on TQM?
59. Develop a TQM policy for a company your choice.
60. How a company can achieve total customer satisfaction?
61. Why should the companies have Rolling Annual Plans?
62. What are the activities to be undertaken at Quality Head Quarters?
63. What are the duties of a Unit Head in implementing TQM?
64. What are the duties of Quality Improvement Team/

65. What are the duties of Quality Assurance Department in implementing TQM?
66. Explain online defect-detection and prevention.
67. Internal customers of any firm should be satisfied. Discuss.
68. Why should the Quality Assurance Department should have a data bank on defects, non-conformance, test parameter etc.
69. What are the functions of Quality Committee?
70. What are the functions of Unit Head implementing TQM?
71. What are the responsibilities of Executive Team in implementing TQM?
72. What are the functions APEX Committee in implementing TQM?
73. What are the functions TQM Secretariat?
74. What are the functions of Executive Team?
75. Prepare a check list for TQM Execution in accompany of your choice.
76. How to implement TQM in tiny industries?
77. Explain Appraisal Survey.
78. Reconstruction of system is necessary. Why?
79. How a Company can manage crisis with respect to technology?
80. Companies should work continuously for improvement for improvement.Discuss.
81. Industrial relations play a crucial role in implementing TQM. Discuss.
82. Interdepartmental teams should be formed to solve complex problems. Discuss.
83. Vendor development is crucial for implementation of TQM.
84. Explain 5'S' concepts?
85. What are the benefits of 5's' concepts?
86. Explain JIT concept with examples.
87. Explain KAIZEN concept.
88. Explain PDCA with examples.
89. Prepare a Route chart for QC process.
90. List out the principles of Deming.
91. List out the principles of Juran.
92. List out the principles of Philip Crosby.

93. Service Quality is as important as Product Quality. Discuss.
94. What are the shortcomings in the implementation of TQM?
95. What are the benefits of TQM concepts.
96. Explain ISO9000 Management system
97. How does Information Technology can facilitate TQM?
98. How would you go about designing an MIS for getting customer input for Quality improvement?
99. Identify two or more measures of quality for a restaurant and explain how to achieve them.
100. Explain the benefits of just in time

ANSWERS TO CHECK YOUR PROGRESS

1. International Organization for Standardization, responsible for the ISO 9000, ISO 14000, ISO 27000, ISO 22000 and other international management standards.
2. Absence of any non-conformance of product or process with respect to the the requirement and time of checking (inspection/test) for conformance,(Requirements may change over time by way of revision of accepted standards/limits. IN such a case, the zero defect should be interpreted according to the revised standards/limits.)
3. Greater customer loyalty, Improvements in market share, Higher stock prices. Reduced service calls, Higher prices, Greater productivity and cost reduction
4. Recognize the need for change and get the commitment of top management Incorporate quality in the strategic plan as the linchpin of differentiation. Formulate and adopt a holistic quality policy statement adapted to ISO requirement Get support and commitment form all managers. Determine the scope of the business to certified. Will it be a particular process, related facilities, a geographical site, or the whole company?

   Determining the status of the current quality system through an internal audit. Define the gap between where you are and what it will take to close the gap.

   Estimate the cost in time and money and implement the plan by organizing the necessary action steps.
5. Implementing a continuous system of quality management approach through out a system of practices in order to maintain a consistent quality